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CONTENTS

FEBRUARY 1983 Vol II. No 3

News & Reviews

GAMES NEWS 16
Can you land your Spectrum? Or evolve up from amoeba into a human being? Or tackle the Castle of Riddles for £1,500 worth of prizes?

ARCADE ACTION ... 30
Take up your lance and mount your ostrich in Joust, the latest flight of arcade fantasy. Plus new 3D thrills from Sub-roc 3D.

VIDEO SCREENS 84
We check out the amazing Colecovision and find it a graphical street ahead. And news of the independent software ranges for the Mattel Intellivision.

REVIEWS 98
We check out the best Pacman version for the Spectrum and try our luck on Sorcerer's Island.

NEXT MONTH 5

Sci-fi rapping

Communicating with aliens is not always as easy as: "Me Elliott, you E.T." David Langford challenges you not to alienate the aliens as they swarm into the atmosphere above you uncertain whether to make friends or attack.

We take you through the sci-fi precedents and offer a listing on page 24.

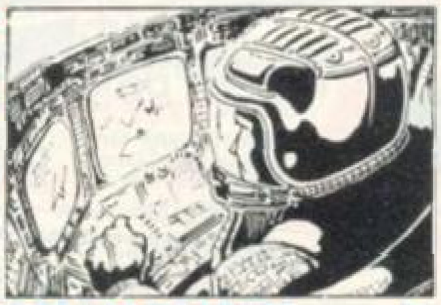
Befriend an alien today. Star Wars only had one empire, we've got seven and inter-space conflict is breaking out on page 86. This unique competition/game will be running for many months to come, with a new winner every issue. It may be too late for you to take part in February but there's nothing to stop you joining in Seventh Empire for March.

Listings

AIRLINE PILOT 32
Hope for a happy landing as you head for the airstrip in a giant Jumbo jet. You'll have to stay Sharp to survive ....

GOLF 38
Fore! Grab your woods and irons and head for the BBC golf-course. But stay away from the bunkers or things could get rough!

POMPEII 42
In the ashes of the ancient roman city some gaming counters in the shape of trussed up chickens were found. Our ace Texas puzzler Stephen Shaw travels back in time to bring you a game an Emperor may have played ...



ESCAPE FROM THE PYRAMIDS OF MARS 48
Mars hides many secrets beneath its shifting sands, and ZX81 owners are about to unearth one of them. Dare you enter the mysterious alien pyramid?

TANKER 53
Action on the high seas for all of you seafaring Spectrum types.

OVER THE ORCHARD WALL 56
Here's a bit of fruity fun for Atari scrumpers. Our Arthur has nipped over the wall in search of apples and he wants your help ....

FRUIT MACHINE 62
All the fun of those "one-armed bandits" and it won't cost you a penny — except for the price of this magazine. Gambling without profit or loss for Vic owners.

MISSILE COMMAND 66
It came from out of the arcades and now it can be found hanging around with a Dragon. Explosive action for a new micro as you try to save your collection of cities from a host of dropping nuclear warheads.

RHINO 68
Out in the bush something stirs. It's big and extremely mean. Our only advice to Atom gamesters is to run as fast as you can!

KRAZY KONG 72
Grrrrrrr! That big gorilla has kidnapped the girl of my dreams and I'm going to get her back. Just let me get my hands on my Pet and the rescue will be on ... If you enjoyed the last screens of Donkey Kong in the arcades you'll love the action in our own special version.

Features

MAILBAG 7
Spectrum v. BBC: The readers' debate continues.

COMPETITION 10
Sorcerer's Stones takes first prize in our Fantasy Game Competition.

PRESTEL 22
Could Micronet provide you with a fund of cheap software?

SCIENCE FICTION .. 24
David Langford tries talking to the aliens

CHESS 27
Max Bramer checks out the problems of mate-in-two.

BUGS 28
Panic bordering on hysteria as the Bugs' micro threatens to break-up.

MACHINE CODE 78
Ted Ball tackles the arithmetic side of speeding up your programs.

GRAPHICS 81
Remove the hidden lines for 3D solidity in your graphics.

ADVENTURE 82
More guidelines for keen adventurers

SEVENTH EMPIRE ... 86
A Colour Genie is up for grabs as space tribes take flight

REVERSI 89
John Ball helps with computerising Othello

PROJECTS 91
Keith Mott introduces his new column

WARPATH 92
Ron Potkin reins in to tell us about the characters in his Wild West game.

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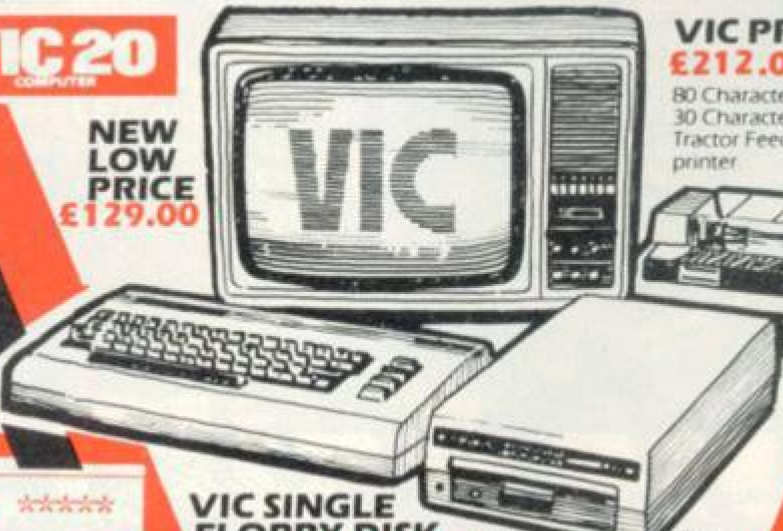

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NEXT MONTH

Hot-on-the-heels of the Book of Games comes our Book of Reviews in the March issue.

Our next issue boasts a free give-away guide to all kinds of computer games, who supplies them and how they compare.

We have sections on adventure games, chess, draughts, othello and backgammon games, arcade maze games, space attack games, novelty games and many more.

There's expert advice on how to choose the particular type of game you are interested in, what you should be looking for and what standards to expect.

For those of you unfamiliar with particular games, we have devoted a page to explaining the differences between Donkey Kong and Frogger, how to recognise a Galaxian when you see one and how to tell whether a Pacman ghost is edible or not.

Each cassette or disc reviewed is marked in our usual three categories, Getting Started, Value and Playability and if it scores three 10s you know our judges have been suitably impressed.

It all adds up to the most striking work yet on games software and it's free inside every copy of *Computer & Video Games.*

All you Seventh Empire competitors will need our March issue to check on your new position in the Seventh Empire game.

You might have proved to be the best fleet commander in the galaxy and earned yourself a Colour Genie on the way.

But even if you work out your score to be well behind the leaders, keep your fleets on the move in March there's still plenty of time to catch up.

Among our top games for March will be: a version of Donkey Kong — featuring Mario the carpenter and an escaped gorilla; Digger will ask you to dig a hole and trap a rampaging alien; there's Skiing, Rockfall and Dr Who Adventure.

WHAT'S BUGGIN' YOU?

Not getting a regular copy of *Computer & Video Games* eh! How do you expect your micro to work proper if you aren't reading the magazine every issue? And you with a nice little computer like that too.

Of course, I can't promise that if you had a regular copy of *C&VG* on order, your rampack would mysteriously stop wobbling overnight . . . but who can tell eh . . .

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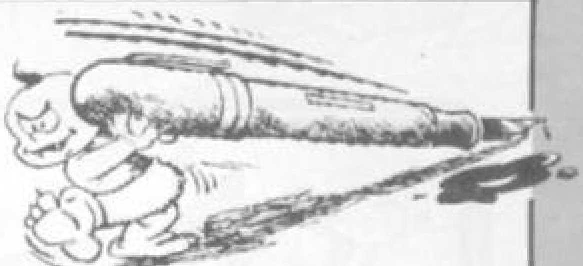


Confessions of a Bug

So you think it's easy being a Bug huh? Well you should try sneaking a dodgy listing past the *Computer & Video Games* testers.

The month of January tho', we didn't do too bad. Mal Function managed to pull a whole host of lines out of the ZX81 game Curse of the Aztec Tomb (shown below).

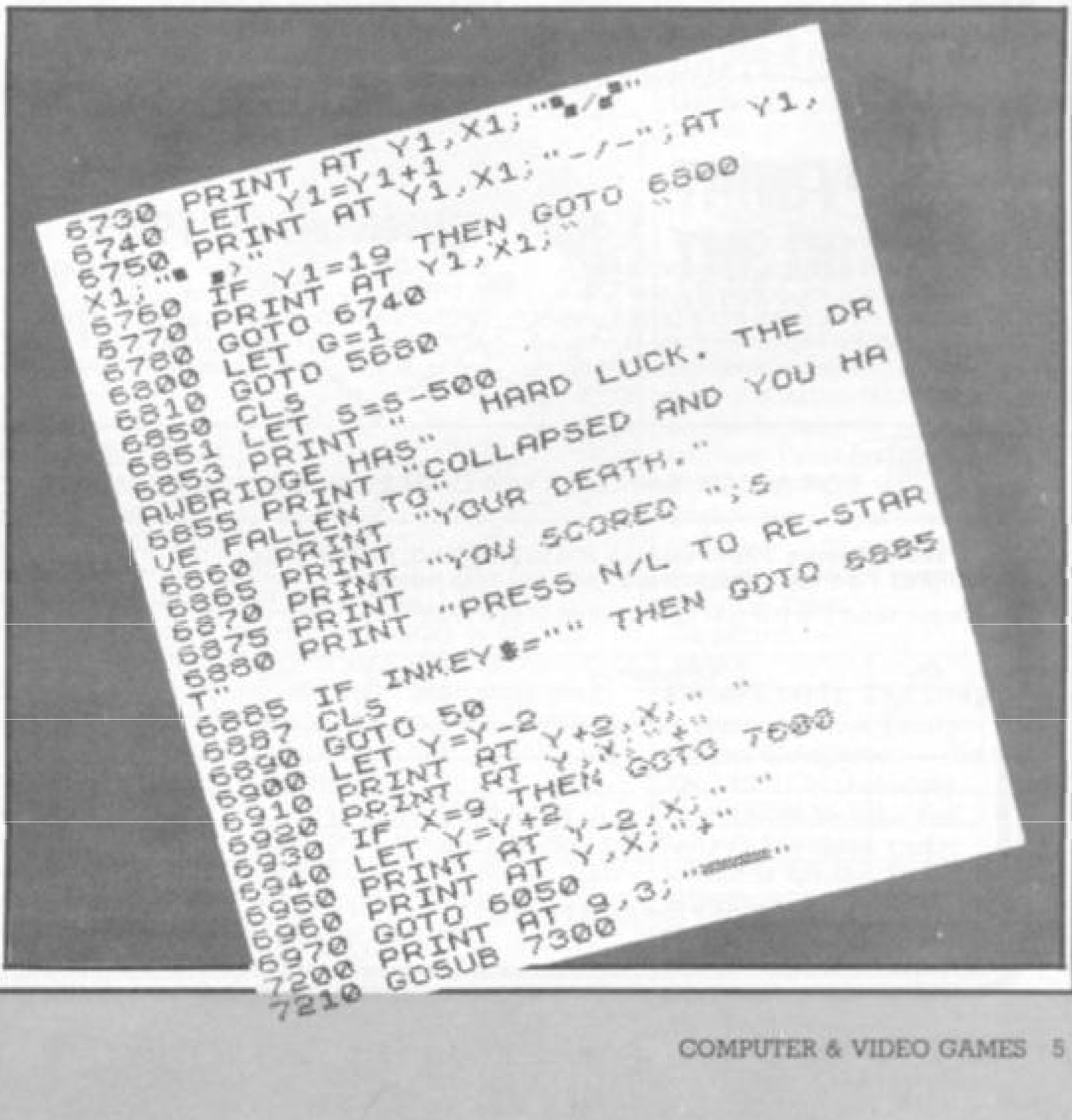
On Cave Flight most of you managed to spot the two arrow errors. In line 2040 the arrow should point left. In line 2515 the arrow should point right.

Dragon problems are fixed by:

250 IF INKEY$=""THEN 250

150 CLSO: CLEAR 200: FOR I=0 TO 448 STEP 32: PRINT @ I, CHR$(245);: PRINT @ I+31, CHR$(250): NEXT 1 : PRINT @ 0, STRING$(32,255);

330 FOR 1=65 TO 161 STEP 32: PRINT @ I, STRINGS$(30,(143+(I−1)/2));; NEXT I : RETURN



```
6730 PRINT AT Y1,X1;"▝▖/▗▘"
6740 LET Y1=Y1+1
6750 PRINT AT Y1,X1;"-/-";AT Y1,
X1;"▪ ▪>"
6760 IF Y1=19 THEN GOTO 6800
6770 PRINT AT Y1,X1;"   "
6780 GOTO 6740
6800 LET G=1
6810 GOTO 5680
6850 CLS
6851 LET S=S-500
6853 PRINT "     HARD LUCK. THE DR
AWBRIDGE HAS"
6855 PRINT "COLLAPSED AND YOU HA
VE FALLEN TO"
6860 PRINT "YOUR DEATH."
6865 PRINT "YOU SCORED ";S
6870 PRINT
6875 PRINT "PRESS N/L TO RE-STAR
T"
6880 IF INKEY$="" THEN GOTO 6885
6885 CLS
6887 GOTO 50
6890 LET Y=Y-2
6900 PRINT AT Y+2,X;" "
6910 PRINT AT Y,X;"+"
6920 IF X=9 THEN GOTO 7000
6930 LET Y=Y+2
6940 PRINT AT Y-2,X;" "
6950 PRINT AT Y,X;"+"
6960 GOTO 6050
6970 PRINT AT 9,3;"▀▀▀▀▀▀▀"
7200 GOSUB 7300
7210
```

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SPECTRUM OUTBURST

Dear Sir,
I really must reply to Mr McAuley's extraordinary outburst on the Sinclair Spectrum.

The fault record of previous Sinclair machines was truly deplorable. A number of my friends and colleagues have had them. All have had problems and one tells me that the ZX81 he bought in April this year has been back to Sinclair four times so far. It has been in his hands for only seven weeks so far.

The Spectrum may be better; so few have been cleared so far that we cannot judge.

Sinclair machines are presumably meant for entertainment only. The Basic used is both limiting and limited with a consequent effect on possible programs.

Judging by the reaction of my nine-year-old son, who has used a friend's Spectrum, it is outgrown within three months. £215 for a three month toy is expensive by my standards.

Most adults are prevailed upon to buy a micro with two distinct arguments: (a) to assist in the education of their children.
(b) to use themselves for serious work.

What serious work could be done on a Spectrum? A payroll — for maybe twenty employees? Stock control for perhaps fifty item lives and five movements each per week? Word processing is out, without CP/M compatibility.

As for his penultimate paragraph, is he really telling us that Sinclair computers compete with the likes of IBM, Canon, Burroughs etc? Indeed, Sinclair manufactured calculators in the past, and micros now, but I was not aware that Sinclair make or have ever made computers?

"ITV is the best in the world!" I have live in Germany, France, Italy, Canada, Australia and the USA. With the exception of much native USA product, all these countries produce first class TV programmes.

If I had only £300 to spend I don't think I'd buy either any Sinclair product or the Beeb.

I think I'd go for the Genie II — a much underrated machine. As it is, I spent rather more on a 64K machine nearly a year ago, with not the faintest sniff of a breakdown so far. Good for games, and with CP/M, equally so for business.

Lastly, "Methinks, thou dost protest too much" Mr McAuley!
R. H. Hill,
Woodford Green,
Essex.

BBC IS THE BEST, OK?

Dear Sir,
I have just read Alan McAuley's letter in your December issue with disbelief. Has he actually used a BBC Micro? I doubt it very much.

For all those Spectrum owners, who, mistakenly, think the Spectrum is "better" than the BBC Micro: just look at the facts.

Spectrum good points: Syntax check on entry, cheap price.

Spectrum bad points: Slow BASIC (3-5 times slower than the BBC Micro).

Poor quality sound (the BBC Micro has four sound channels with full ADSR control). High resolution graphics poor. Keyboards extremely difficult to type fast on (BBC Micro has a very good keyboard). Keyboard system a waste of time: up to six key presses needed for some functions! (Anyway, most BBC Basic commands can be abbreviated).

Note that I haven't mentioned the BBC Micro's built-in assembler, the flexible Mode system for choosing screen format, the superb extended Microsoft Basic or the brilliant software available: just look closely at the Acornsoft range.

I hope this letter has finally shown to all those Spectrum owners that the BBC Micro is the best home computer in the world.
Richard K. Lloyd,
Wirral,
Merseyside.

ICE VENDOR VINDICATED!

Dear Sir,
With reference to *Computer and Video Games* issue number 13 — November 1982. I am writing to complain about the Pet/Apple program, Ice Cream Vendor. Line 10 reads:

```
VTAB 10: PRINT TAB (10)
"*********************"
```

I was putting the program in our Pet computer at school when after the 19 we listed the program and a syntax error appeared in line 10.

We tried deleting the "v" in it and that didn't work then we tried a space between the "v" and the "tab" but that still didn't work.

After about 10 minutes of puzzling it out we decided on deleting the "v" and the "tab" and Bingo! it worked!
Andrew Gardner,
Shanklin,
Isle of Wight.

ALIEN CHASE AMENDMENTS

Dear Sir,
Many thanks for the excellent standard of games in your magazine. I haven't typed in a bad one yet!

However, the December issue BBC game Alien Chase could give those of us with issue 1 (etc) operating systems some trouble.

In order to retain the features of the game, 2 changes need to be made:

```
50 VDU 23;10,32;0;0;0;
110 IF INKEY(−99) THEN
I%=226 ELSE IF
INKEY(+122) THEN I%=249
ELSE IF INKEY (−26) THEN
I%=153
```

This does the trick and the game proceeds as designed. I have also written an amendment for joysticks:

```
110 IF (ADVAL(0)AND3)=1
I%=226 ELSE IF
ADVAL(1)<21000 I%=249
ELSE IF ADVAL (1)>44000
I%=153
```

Dave Carlos,
Garforth,
Leeds.

TANDY AND THE DRAGON

Dear Sir,
Please could you tell me if the Tandy TRS-80 machines uses the same machine code as the Dragon 32 and if you can use Tandy games on it? If there are any other computers that use the same machine code could you tell me about them.
John De Sylva,
Guildford,
Surrey.

Editor's reply: The Dragon is based on the Tandy Colour Computer — not the TRS-80. It is therefore impossible to take the latter's machine code, which is for the Z80 microprocessor, and use it on the Colour Computer/Dragon 32, which has the 680S processor.

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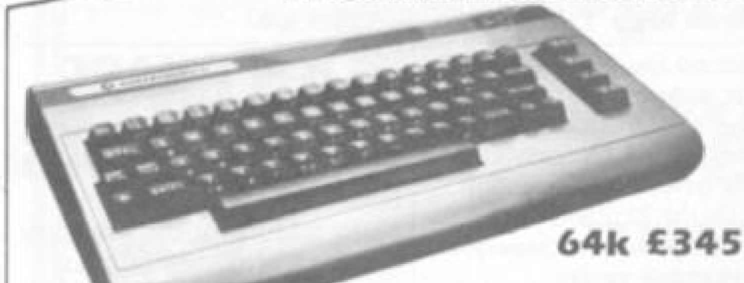

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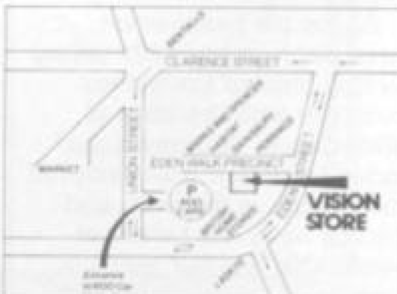

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MAILBAG

SEARCH FOR SOFTWARE

Dear Sir,
Having bought a Dragon 32 micro-computer I have found that up to now there has been a lack of available software for it.

I have heard, however, that because it uses microsoft basic it is possible to use software from the Tandy Colour Computer and the BBC computer. Is this correct?

And will you be featuring the programs for the Dragon in the near future? Keep up the excellent (art) work!!

Simon Malpas,
Keyworth,
Nottinghamshire.

Editor's reply: It is possible to enter listings for programs designed for the Tandy Colour Computer with very little modification.

Although all the more popular computers claim to use Microsoft Basic, there are so many different versions that it is very difficult to translate Pet to Apple to TRS-80 to Colour Computer/Dragon 32.

The BBC does not use Microsoft Basic it uses a peculiar and unique Basic that is supposed to be compatible with Microsoft. This is rather a tenuous claim for some of the commands!!

THE DREADED DISC QUIZ

Dear Sir,
As a video games enthusiast and the proud owner of an Intellivision games console, I was delighted to find your magazine at my local newsagent and have taken it regularly ever since.

Although I do not own a micro at present and so cannot run the programs listed each month, I do get immense enjoyment from reading all the other features, i.e. Mailbag, Games News, Arcade Action and so on.

However, having said that, I have heard that Mattel do plan to launch an add-on keyboard about March of this year so there are some programming possibilities.

My main reason for writing to you is to try to find out what other people think of the Mattel system and in particular the "dreaded disc", their alternative to either joysticks or paddles as favoured by Atari, etc.

Although I find the disc reasonably easy to manage myself, most of my friends seem to disagree. Perhaps if this aversion could be got through to Mattel they may seriously consider bringing out some alternative form of control.

Finally, here is a list of my current high scores: Space Armada 500,320; Astrosmash 1,125,760; Lock'n'Chase 136,980; Space Hawk 253,890.

I would be most interested to learn if anyone can beat these or of any other high scores on Mattel games.

Marc Duffield,
Huddersfield,
Yorks.

THE BUGS ARE OUT!

Dear Sir,
One night after I had fallen asleep over my Sinclair Spectrum I was suddenly woken by cries of "Stamp on him", "Shove a club in his mouth!" Quick as a flash, I jumped up grabbed my camera and managed to get a photo of this amazing attack before they all disappeared inside my copy of *Computer and Video Games*!

Please print the photograph otherwise no-one will ever believe me.

J. Carroll,
Rishton,
Lancashire.

BACK TO THE MANUAL . . .

Dear Sir,
Please would you explain how to introduce variables into a defined function from the main body of a program for BBC Basic.

Neeraj Sharma,
Slough,
Berkshire.

Editor's reply: This is quite complex Basic programming I suggest you look at page 230 in the BBC manual.

GETTING THE CONNECTION

Dear Sir,
We have a BBC Model B at our school. We also have two printers, an Epson dot matrix printer MX80 F/T and an MX80 F/T type II which we use with our Research Machines 380Z.

I have some programs for the BBC which I require hard copies of, and as we do not yet have a BBC printer I was wondering whether either of the printers are compatible.

Could you also advise me on the best Space Invader type games for the BBC?

Martin Noakes,
Sittingbourne,
Kent.

Editor's reply: If you have a Model B computer then the Epson printers — with RS232C interfaces — should work OK; however, the socket at the rear of the BBC computer — 5-way PIN — is non-standard for RS232C. So a special cable is required. (See page 406 of manual). Centronics parallel standard is available through the parallel printer post. It all depends on your printers which standard you use.

Both of the following companies produce good Invader-type programs. Bridge Software, 36 Fernwood, Marple Bridge, Stockport. Amba Software, 13 Cherry Bounds Road, Girton, Cambridge CB3 0JT.

JOIN UP FOR ADVENTURE

Dear Sir,
A postal BBC Micro Adventure/Fantasy Club has now been formed. The club will provide a central library of Adventure and Fantasy games written by the members for the use of other members.

In this way Adventurers can find a ready group of fellow enthusiasts to share their fantastic journeys. Send an s.a.e. for further details.

BBC Micro Adventure Club,
29 Blackthorne Drive,
Larkfield,
Kent, ME20 6NR.

MYSTERIES OF THE SCROLL

Dear Sir,
Recently I have been trying to get my Vic to print random dots on the screen at random, then scroll the screen from right to left, while still printing dots at random. My attempts have been fruitless.

Please could you tell me the solution before I go mad with frustration!

J. Skelding,
Stourbridge,
West Midlands.

Editor's reply: It is easy, using the Poke instruction to get random dots on the screen. For example, using the information on pages 143/144 of the Vic instruction manual.

```
10 x = INT(RND(1)x506+1)
20 POKE 7680+×,42
30 GOTO 10
```

This will produce a random pattern of stars. I suggest you read the appropriate section of the *Vic Revealed*, by Nick Hampshire for ideas on how to scroll from left to right — it's far too complicated to explain in this small space.

Solving our earth invading puzzle

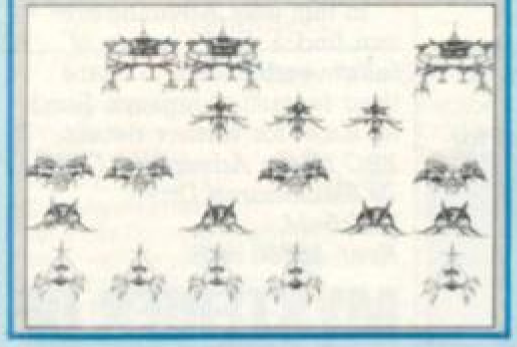
Saving the Earth from the alien hordes was the problem we set you last month and the more spirited defenders amongst you replied swiftly enough to keep our atmosphere free for eons to come.

The best solution Trevor Truran could manage was 21 shots to clear the atmosphere, or just two missed shots.

His best effort began at F and went on: A, E, B, E, C, C, D, B, F, B, C, C, F, C, A, D, A, C, D, F.

We will be publishing the winning names next month.

And Trevor's back with another Puzzling column in March.



It's the turn of space pirate Austin Cambridge to hold forth on our special C&VG computer moderated game of Starweb, which is now drawing to a close. Austin's views on the galaxies of Starweb are reported faithfully by Anthony Shepherd, below.

PIRATE WITH A HEART OF GOLD

I'm the brighter buccaneer, the Simon Templar of the Space lanes, the man in the white space helmet. I may be a Pirate King but I am a **Good Guy**. I seek out and eliminate the outposts of my arch enemies, the oppressive Berserkers.

One of these, Gzinti, has been a thorn in my flesh with his absurd threats and impudence.

Another, a former ally of mine, threatened me recently so I sent the fleets in.

I liberate the oppressed prey of Berserkers, set free those under the yoke of Empire Builders like Merchants and Artifact collectors.

And what do I take in return? I do not seek to kill populations or make people work hard on my fleets, all I ask for the liberation of the oppressed is a little piece of the boodle, a few spondulix, some wherewithal, little to ask for my services to lifekind.

It must be shown that aggression does not pay, aggressors must be punished, and I am the man capable of such a feat.

I am amassing a Task Force.

A collection of fleets, this force will be so fast that when in Battle formation it will almost blot out the most powerful of Suns.

A force so huge and powerful that Berserker robots will quail at its presence, and Apostles will pray at its coming.

This task force will be headed by myself in the flagship, A.C. Freedom-for-All ready to wage terrible war on evil-doers.

We will fight them on the Spacelanes, at the planets and near the Black Holes, there will be blood, oil, and tears, but we will never surrender . . .

There is No Alternative but to stand up and fight. The time for Diplomacy is over, the time for action is here. Fight, we will, for the elimination of Berserkers and lifekind's inexorable right to be free!

I am so cool I could fluster a Penguin, and I am so hip I have difficulty seeing over my pelvis.

Never let it be said that Austin Cambridge did not play the major role in the freedom of the Galaxy.

A GOOD HOME FOR A DRAGON

The Sorcerer's Stone has captured a Dragon for its creator.

Andy Burras of Lindle Lane, Hutton, Preston in Lancashire, is the worthy winner of the Fantasy Game Competition we set in our November issue.

He wins a Dragon 32 microcomputer on which to pursue his thirst for fantasy games. And he is also being invited down by Mitre Wargames, which judged the competition entries, to discuss putting Sorcerer's Stone into operation as a new computer moderated game format to be played commercially.

Mark Blundell, of Mitre Wargames was impressed by the high standard of entries and offers his commiserations to the unlucky entrants, but felt that Sorcerer's Stone came closest to a workable computer moderated game format. "The author had put a lot of thought into how the game could be put onto a computer," said Mark.

Sorcerer's Stone is a game for 12-15 players, who each takes control of a wizard in a tower. The aim is to capture the Sorcerer's Stones by making use of the wizard's orcish, elven and dwarvish servants and casting spells by using up power points.

The game has been well planned out for use on a computer and Mark is confident that he will be able to report on a new fully-fledged British computer-moderated game in the autumn.

A Dragon 32 will be winging its way, courtesy of Dragon Data, to Andy in Preston.

● Apologies if you are still waiting for news of our pinball competition, which was run over August and September. Bally's US Pinball Division have had a tough job sorting through the huge pile of entries we sent Stateside but Bally are announcing the winner next month to coincide with the UK Amusement Trades Exhibition. So keep your fingers crossed.

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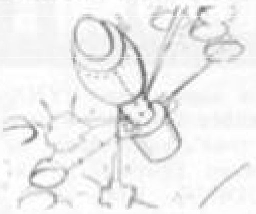

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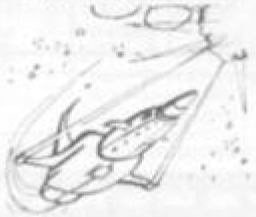

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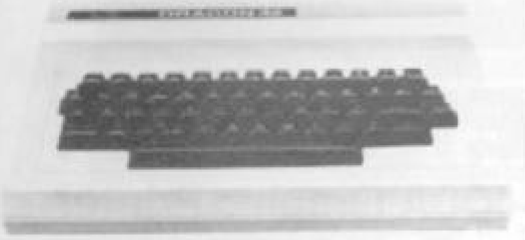

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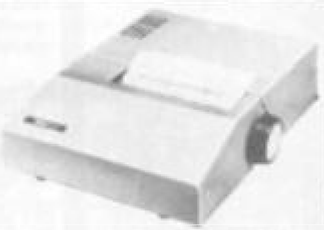

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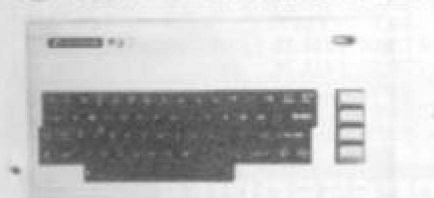
Commodore VIC-20



Sensational NEW LOW price

£139.90 INCLUDING VAT

(£121.65 Exluding VAT)

Now a top quality home/business micro for the price of a games machine.

■ Memory expandable to 32K ■ High resolution (full PET type) graphics ■ 16 Screen colours and 8 border colours ■ Plugs in to your TV. or monitor ■ Add Disk Drive & Printer for impressive 170K Byte system ■ Can act as an intelligent terminal for a larger computer.

VISCOUNT SUPER X2

64K DYNAMIC RAM PACK for VIC-20

EXCLUSIVE TO SPECTRUM!

Unbelievable-but-true, now you can up grade your VIC-20 from 3.5K to a massive 67½ RAM. Enables you to load up to 8 games or programs at a time & still select which one you wish to use. Can be used in conjunction with other expansions to increase total memory up to 152K-using the VIC memory expansion board. The SUPER X-2 will make your VIC-20 the biggest little micro in town!

Spectrum LOW price £114.94 INC. VAT

(£99.95 excluding VAT)

New!

COMMODORE 64

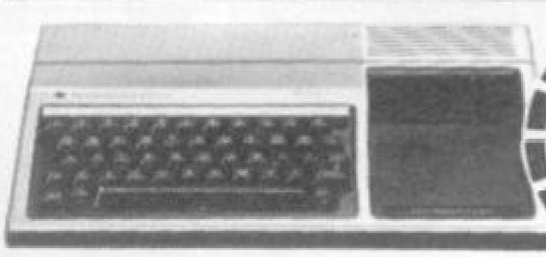
Just Arriving

Limited stocks are just arriving of this super new micro. Just look what it offers!

■ 64K Ram ■ Z80 processor option ■ Dedicated video chip ■ Sprite graphics ■ Music synthesizer ■ Prestel link ■ High resolution graphics (320 x 200) ■ 16 colours and lots more.

£344.99 INC VAT.

TEXAS T199/4A



Sensational
£50
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£50 CASH REBATE WITH EVERY TEXAS TI99-4A PURCHASED

■ 16K RAM (expandable to 48K) ■ Built-in 14K Byte BASIC interpreter ■ 16 Bit Microprocessor ■ 16 Colour High Resolution graphics ■ Extensive range of solid state software command modules available from games to architectural aids.

Spectrum LOW Price £198.95 INC VAT (£173.00 ex. VAT)

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RAM Exp. Card	£179.57	£206.50	Number Magic	£12.13	£13.95
Matrix printer	£347.78	£399.95	Addition/Subt. 1	£23.43	£26.95
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TI Invaders	£16.48	£18.95	BASIC	£8.26	£9.50
Tombstone City	£19.96	£22.95	Home Budget Management	£19.96	£22.95
Attack	£19.96	£22.95	... and many more		

MORE SPECTRUM LOW PRICES ☞

Spectrum Computer Centre have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

spectrum

A few examples from our

Software Selection

THORN EMI

Software for Atari	Inc. VAT
Submarine Commander	£34.44
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Darts	£19.49
Snooker & Billiards	£19.49
Pool	£19.49
Cribbage & Dominoes	£14.89
Humpty Dumpty/Jack & Jill	£14.89
Hickory Dickory Dock/Baa Baa Black Sheep	£14.89
British Heritage Jigsaw Puzzles, Vol. 1	£14.89
British Heritage Jigsaw Puzzles, Vol. 2	£14.89
European Scene Jigsaw Puzzles, Vol. 1	£14.89
European Scene Jigsaw Puzzles, Vol. 2	£14.89
Super Cubes & Tilt	£14.89
Figure Fun	£14.89
Cupute 4 & Reversi	£14.89
Owari and Bull & Cow	£14.89
Software for Commodore	
River Rescue	£25.24
Vic Music Composer	£25.24

GEM

Software for ZX81, Dragon and Spectrum	Inc. VAT
Monster Mine (for ZX 81)	£4.95
Monster Mine (for Spectrum)	£4.95
Monster Mine (for Dragon)	£7.95
Space Mission (for ZX 81)	£4.95
Space Mission (for Spectrum)	£4.95
Space Mission (for Dragon)	£7.95
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Games, Pack II	£7.95
Vulcan O/+	£7.95
Games Compendium DI	£7.95
Golf	£7.95

SALAMANDA

Games for Dragon 32	Inc. VAT
Dragon Trek	£9.95
Wizard War	£7.95

RABBIT

Software for Commodore VIC20	Inc. VAT
Space Storm	£6.49
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Dune Buggy	£4.49
Super Worm	£4.49
Jungle	£4.49
Cosmic Battle	£4.49
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Rabbit Functions	£4.49
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Night Flight (3K)	£4.49
Rabbit Writer (16K Cassette)	£19.49
Rabbit Base (16K Cassette)	£14.49
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Night Crawler	£9.49
Hopper	£9.49
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Electron 22622	£9.20
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Junior Maths/Stepping Stones	£6.33
Home Budget	£6.33

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Amok	£6.95
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Spiders of Mars	£19.95
Sattelite & Meteorites	£19.95
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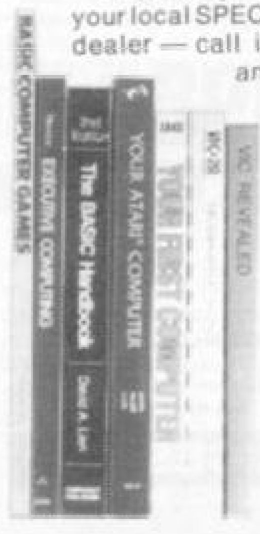
CENTIPEDE
VIC-20
CARTRIDGE
SUPER LANDER
VIC-20
CARTRIDGE

Plus many more at your local SPECTRUM dealer — call in now and see!



BOOKS

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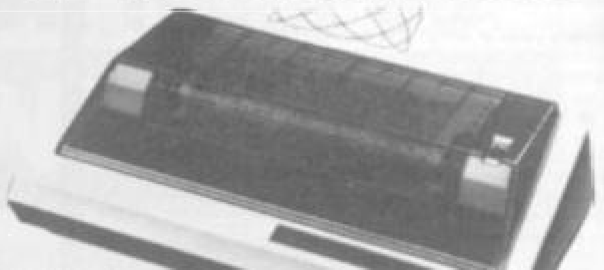
ATARI Operating system listing	£10.43

SEIKOSHA

GP-100A Graphic Printer



Now a top quality graphic printer **at a price you can afford.** The **SEIKOSHA GP-100A – Terrific value** at under **£200** from **SPECTRUM**. Standard Centronics compatible interface for easy link-up with most micros. ■ Full graphics capability. ■ Printing speed 30 chars/sec. ■ Double width character output under software control. ■ Graphics, character and double width character can be intermixed on same line. ■ Paper width adjustable up to 10" – tractor feed. ■ Print position addressable by character or dot.

Spectrum LOW price £229.94 (Price Ex. VAT £199.95)

Also Available	EX. VAT	INC. VAT
GP-100VC (for VIC-20)	£215.00	£247.25
GP250X 50cps	£249.90	£274.85
Optional Interfaces for GP-100A/GP-100VC		
RS232	£70.00	£80.50
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Cables for BBC MICRO, ACORN, DRAGON	£19.58	£22.52

	EX. VAT	INC. VAT
DRAGON (Std.)	£12.95	£14.89
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Data Sheets GP-100 (packet 100)	£17.00	£19.55
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Ribbons GP-250 (box of 12)	TBA	TBA

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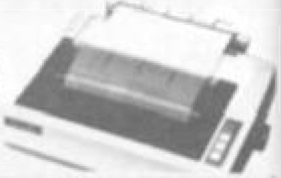
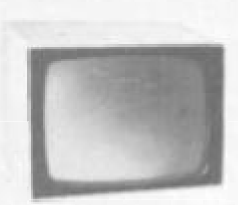
Chosen by SPECTRUM for their reliability, the superb new **top quality** graphic printers from **EPSON**. New features include **super & subscript, underlining & deletion.** If you're looking for an **up-market** printer at a **down-to-earth-price**, call in and see the **EPSON** range at **SPECTRUM.**

Model	EX. VAT	INC. VAT
MX80-T3	£329.00	£378.35
MX80 F/T Type III	£369.00	£424.35
MX100 Type III	£469.00	£539.35

Please see your SPECTRUM dealer for prices of INTERFACE/CABLE options.



ACCESSORIES



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ONLY

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Not all stores carry every advertised item, please phone before making a journey — Prices correct at time of going to press E. & O.E.

FREE!
£75 WORTH
of software
with every MZ80A purchased

SHARP MZ-80A

Desk top genius! - **the all-in-one SHARP MZ-80A**. A personal computer designed with the serious user in mind, **ready to run the moment you get it home.** Built-in keyboard, CRT 9" display and cassette data storage with **48K RAM**. The BASIC with extra useful additions, offers quite a powerful micro for the home or business. ■ 4K Byte ROM + 48K Byte RAM + 2K Byte Video RAM ■ ASCII profiled keyboard + numeric pad ■ 2 page Video RAM allows screen to be scrolled up or down. ■ CP/M available

Spectrum LOW Price **£546.25** Inc. VAT (£475.00 ex. VAT)

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Twin Floppy Disk Unit (inc. I/O Card, Disk, Cable)	£745.00	**£856.75**
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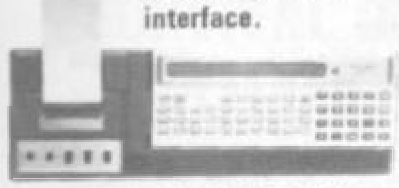
LESS THAN WHOLESALE PRICE!

SHARP PC-1211

Pocket Computer complete with Cassette/Printer interface.

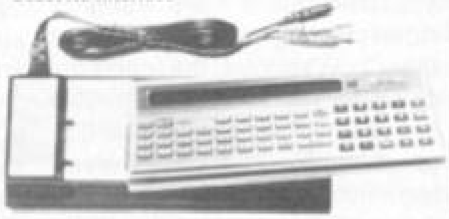


Spectrum LOW price **£110.28** Inc. VAT

(£95.90 ex. VAT)

SHARP PC-1211

Pocket computer complete with CE-1221 Cassette Interface



Spectrum LOW price **£68.42** Inc. VAT

(£59.95 ex VAT)

SINCLAIR ZX-81

SINCLAIR ZX . £49.95
16K RAM pack £29.95
ZX Printer . . £59.95

CASSETTES FOR ZX81	INC. VAT
TYPE—10	
6 GAMES	£3.95
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BUSINESS & HOUSEHOLD	£3.95
SKILL & JUDGEMENT GAMES	£3.95
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SUPER PROGRAMS Nos. 1-8	£4.95
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ENGLISH LITERATURE 2	£6.95
GEOGRAPHY	£6.95
HISTORY 1	£6.95
MATHS. 1	£6.95
MUSIC 1	£6.95
INVENTIONS 1	£6.95
SPELLING 1 (6-11 YEAR OLDS)	£6.95
CHESS*	£6.95
BIORHYTHMS	£6.95

*Requires 16K Ram Memory Pack

COMPUTER BOOKSHOP SOFTWARE FOR SINCLAIR COMPUTERS	INC. VAT
BUMPER 7 1K ZX81	£5.95
1K SUPER TRIO ZX81	£7.95
LABYRINTH 16K ZX81	£5.95
NIGHTMARE PARK/MUSIC 16K ZX81	£6.95
COMPUTACALC 16K ZX81	£7.95
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SPACE INVADERS/RESCUE 16K ZX81	£6.95
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There's a Spectrum Centre near you . . .

ABERYSTWYTH
AberData at Galloways, 23 Pier St. 0970 615522 (Just Opening)

ALDERSHOT
David Saunders Computer Centre, 51 Station Rd. 0252 20130 (Just Opening)

ALFRETON
Gordon Harwood, 69/71 High St. 0773 832078

ASHFORD
Ashford Computer Centre, 2 Station Parade, Clarendon Rd. 07842 44955

BANBURY
Computer Plus, 2 Church Lane. (0295) 55890

BASILDON
Godfrey's, 28-32 East Walk, Town Centre. 0268 289379

BASINGSTOKE
Fisher's, 2/3 Market Place. 0256 22079

BATH
Software Plus, 12 York St. 0225 61676

BEDFORD
Stanad Ltd., 115 Midland Rd. 0234 49341 (Just Opening)

BIRMINGHAM
Sherwoods, Great Western Arcade. 021 236 7211

BOSTON
Fotosound Computers, 19 Dolphin Lane. 0205 64781 (Just Opening)

BRADFORD
Photosave, 18 Cheapside. 0274 308598

BRIDLINGTON
Bridlington Computer Services, 8 Bridge St. 0262 75048 (Opening Soon)

BRIGHTON
Capricorn, 1 Queens Rd. 0273 29634

CAMBERLEY
Camera Arts (Micro Computer Division), 36 High St. (0276) 65848

CAMBRIDGE
KP Ltd., 12a Kings Parade. 0223 68087

CANTERBURY
Kent Micro Systems, Conquest House, 17 Palace St. 0227 50200

CARDIFF
Randall Cox, 18-22 High St. Arcade. 0222 31960

CHELMSFORD
Maxton Hayman Ltd., 5 Broomfield Rd. (0245) 354595

COVENTRY
Coventry Micro Centre, 33 Far Gosford St. (0203) 58942

DARLINGTON
McKenna & Brown, 102 Bondgate. (0325) 59744

DERBY
C T Electronics, at Camera Thorpe, The Spot. 0332 44760

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The Silicon Centre, 6-7 Antigua St. 031 557 4546

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Channel One, 174 High St. 040 24 75613

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The Computer Centre (Humberside) Ltd., 26 Anlaby St. (0482) 26297

HYDE
Pase, 213-215 Market St. 061-366 5935

IPSWICH
Brainwave, 24 Crown St. 0473 50965

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Vennals, 49 Foregate 0568 32175

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LEICESTER
Youngs, 40-42 Belvoir St. 0533 544774

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Square Deal, 375 Footscray Rd., New Eltham. 01-859 1516

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Castlehurst Ltd., 1291 High Rd. 01-446 2280

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Computers of Wigmore Street, 87 Wigmore St. 01-486 0821 (Opening February)

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Camera & Computer Centre, 118 Mill St. 0625 27468

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Lomax Ltd., 8 Exchange St., St. Ann's Sq. 061 832 6167

MANCHESTER GTR.
Mr. Micro Ltd., 69 Partington Lane, Swinton. 061 7282282 open Thurs.-Fri.-Sat. till 8 p.m.

MIDDLESBROUGH
McKenna & Brown, 190 Linthorpe Rd. 0642 248345

NEWCASTLE-ON-TYNE
Newcastle Camera & Computer Mart, 16 Northumberland Ct. 0632 327461

NEW MALDEN
Surrey Micro Systems, 31 High St. 01-942 0478

NORTHAMPTON
Basic Computers & Systems Ltd., 72 Kingsthorpe Hollow. 0604 710740

NORTHWICH
Camera & Computer Centre, 3 Town Sq. (0606) 45629

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Cameo Computers, 8/9/10 Trinity Walk. 0602 42912

OLDHAM
Home & Business Computers Ltd., in store at The Mall, 119 Union St. 061-633 1608

PAIGNTON
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Randall Cox, 19 Main St., 064 668 2876

PRESTON
Wilding's, 49 Fishergate. 0772 556250

READING
David Saunders Computer Centre, 8 Yield Hall Plce. 0734 580719

ROCHFORD
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Computer City, 78 Victoria Rd. 051 420 3333

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Wilding Ltd., 11 Mesnes St. 0942 44382

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Harpers, 71-73 Commercial Way. 04862 61061

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(Typical APR 30.6%)

V.A.T.

You will see that we quote our prices both **including VAT** and **excluding VAT** – **no hidden 15%** to **suddenly up-lift your bill** but also making our prices **easier** to compare with our competitors.

Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

GAMES NEWS

MYSTERY OF THE DARKLY GLOWING GEM

BLACK CRYSTAL

In order to win the Black Crystal you must first seek out the seven gold rings and place them on their pedestals — ranged in a circle around the brilliant gem.

But even before you get to see the crystal you will have to overcome dozens of dangerous challenges. The sheer number of episodes in this game make it one of the longest adventures ever written — with 12 different screen presentations.

As you pursue your adventure you have three main strengths to supplement your natural cunning. Physical strength consists of your two principal weapons, a sword and a shield.

Purity enables you to be brought back to life if you meet with a grizzly end at the claws of one of the dragons or vampires which haunt this adventure.

The spiritual strengths at your disposal are lightning and "power drain".

Black Crystal is available from Carnell Software of Slough at £7.50. The game runs on a Sinclair Spectrum in 16 and 48K and on a ZX81 in 16K.

BEWARE OF UNDERWATER ENEMIES

SUB TRACK

Sub Track is a new Spectrum version of an arcade game.

You command a destroyer being pursued by a fleet of enemy submarines. Your only defence is your depth charges which you must drop at just the right moment so that they will knock out the submarines a few seconds later as they pass below you.

Sub Track is manufactured by the new Spectrum writers — Amba Software of Cambridge.

Also in the range is an Adventure game called Treasure Hunt and a version of Pacman. The games cost £4.95.

WHEN IS A CASTLE A RIDDLE?

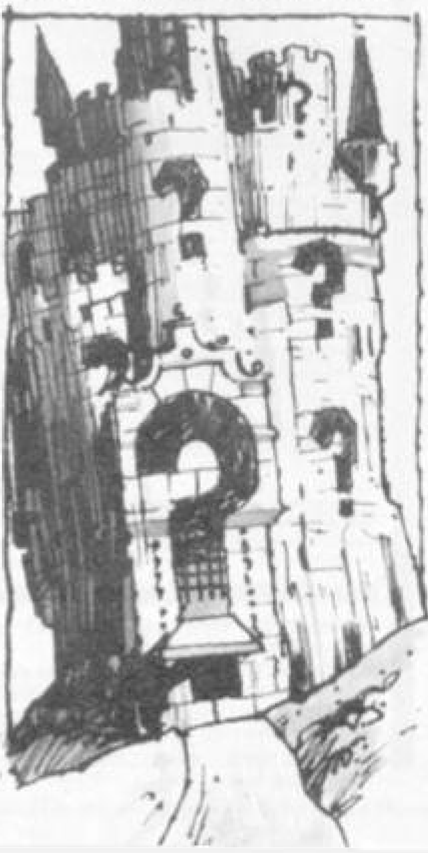
CASTLE OF RIDDLES

More prizes are on offer this month as the software houses compete to sell their goods.

Acorn goods worth £2,000 are up for grabs to the first person to solve the Castle of Riddles adventure for the BBC Model B.

This classic text only adventure has an added twist of humour with such gems as "What gets wet as you get dry?" Answer: a towel.

The release date of Castle of Riddles has been strictly timed so that any one who purchases the game, whether by mail order or over the counter, will have an equal chance of getting hold of the game at the same time and entering the competition.



Other exciting prizes planned for 1983 feature a number of holidays to far-away places. Most interesting of these is Automata Cartograpy's trip to the U.S. to meet a mystery celebrity whose identity is hidden away in the bits and bytes of the new Spectrum game "My Name is Adolf Hitler, You Win a Fat Cigar". Who can the celebrity be? Who will win the prize? Will this reporter be going to the U.S. to cover this momentous meeting? All will be revealed in Games News soon.

Another holiday — destination undecided — it to be put up by Carnell Software of Slough for their next adventure game which will be the sequel to the epic Black Crystal adventure.

A JOLLY MIXTURE OF FUN . . .

COMPENDIUM

That Rolls-Royce of board games, the De-Luxe Compendium is now a thing of the past as all the family favourites such as Snakes and Ladders, Ludo, Fox and Geese, Beetle, and even Noughts and Crosses can all be stored on one computer cassette.

The computer compendium has a number of advantages over the traditional board version. It is impossible to lose the counters and the dice or other essentials to play as these are safely stored away on the cassette tape.

Furthermore, in a game like Noughts and Crosses for example, you can play against the computer if you are short of another human opponent.

A games compendium for the Sinclair Spectrum in 16K has been produced by Dymond Software of Annan. It features the above five games and is available from the Dumfriesshire based firm at £4.95.

LAST REFUGE OF THE GALAXIANS

ARCADE CLASSICS

Arcade classics Galaxians and Defender are enjoying a new lease of life as games manufacturers regularly churn out versions for the popular micros.

Defender is one of the few video games to come out of the boom period of 1980-81 to be still consistently earning ten pence pieces in the local pubs and arcades.

Its paintwork is probably now a little shabby but you can be sure that wherever a Defender machine is found there is also a small group of devotees regularly rescuing the humanoids.

The bluebottle like Galaxians have not been quite so fortunate. Pushed aside by Robotrons, Burgertimes, Pacmans, and more recently Pengos — it now seems that British Rail buffets and bars are the only sure places to find a Galaxians machine these days.

Whatever the future holds for these quaint old relics of the pay-as-you-play games era you can still enjoy them as versions are now on sale for the BBC Model B, and Atari 400 and 800.

Cambridge based Acornsoft produce the games for the BBC machine — though sold under different names Planetoid is Defender and Arcadians is Galaxians.

The Atari versions are available under the original names although the retail prices are not available as we go to press.

GAMES NEWS

GO TO WORK SMASHING AN EGG!

EXTERMINATOR

If you shook with fear while watching Hitchcock's *The Birds* then you will be scared to learn that they are back. This time gunning not only for planet Earth but the entire universe!

You are charged with the mission of seeking out the birds' secret lair on the planet Dron. This is where they lay their eggs and hatch their plot of intergalactic supremacy. The only way to stop the birds is to destroy their eggs.

Exterminator is the name of the game for the TRS-80 or Video Genie. It can be purchased from Algray software at £7.95.

Also new from Algray this month is a 3D adventure game called Double Agent. You are the spy who must break in to a high security fortress and escape with top secret plans. The game comes with a money-back guarantee from the Barnsley based company at £12.95.

SURVIVAL OF THE FITTEST AMOEBA!

EVOLUTION

Experience millions of years of evolution in a few minutes in this latest game for the Apple.

Only the strong survive in Evolution — sentiments which Charles Darwin would no doubt echo.

You begin the evolutionary cycle as an amoeba swimming in a fluid of DNA cells which you must try to consume to nourish your weak one-celled life form. Spores, microbes, and antibodies are also struggling for supremacy and will feed on you if they can touch you.

If you survive the amoeba stage you then jump a few million years to become a frog. This time flies are your food source and fish your competitors.

From frog you go on to rodent, then beaver, then gorilla and finally human. The game does not end there. A final battle must be fought with the mutants followed by a nuclear war which could just spell doom for the human race.

Evolution was written by two Canadian teenagers who brought it into the offices of a Vancouver based business software house.

The firm liked it so much they decided to market it. And now the youngsters are predicted to be thousands of dollars better off by the end of 1983 according to the managing director of the company.

The game is produced by the Sydney Development Corporation — a Canadian business software firm. *It is available in this* country from Pete and Pam Computers at around £20.

DOWN TO THE SEA AND SKY AGAIN

SUB COMMANDER

Submarine Commander and Jumbo Jet Pilot, the two TV advertised games from Thorn EMI for the Atari 400 and 800 will shortly be available for the Texas Instruments 99/4a.

The simulation games give you a taste of flying a Jumbo and commanding a submarine in war time. Both games feature a variety of realistic controls. Submarine Commander for example challenges you to destroy all enemy shipping operating in the Mediterranean.

You have sonar to help you find them when submerged, radar, oxygen level, fuel, battery charge, depth under your keel, periscope and screen presentations of the surface and sky line, a map of the Mediterranean, and radar scanner.

The games will be on sale towards the end of January at around £30.

WIN YOUR COWBOY SPURS . . .

CHISHOLM TRAIL

TI owners can look forward to a wider choice of games in the new year as some of the smaller software houses — currently manufacturing for the Vic, Spectrum, and BBC machines — are negotiating with Texas to produce games for the 99/4a.

The latest game from Texas takes you back to the cattle trails of old Kansas with rustlers, wild steers and wranglers. For non High Chaparal fans a wrangler is a semi-legal rustler employed by a rival cattle herder to pick up the strays from your herd and then brand them with his own mark.

Chisholm Trail takes its name from the famous cattle trail between Texas and Kansas where many a cowboy earned his spurs. The aim of the game is to get your herd from Texas to Kansas with as few losses as possible.

The game is available from TI dealers now at around £22.

THE GAME OF THE BOOK OF THE FILM . . .

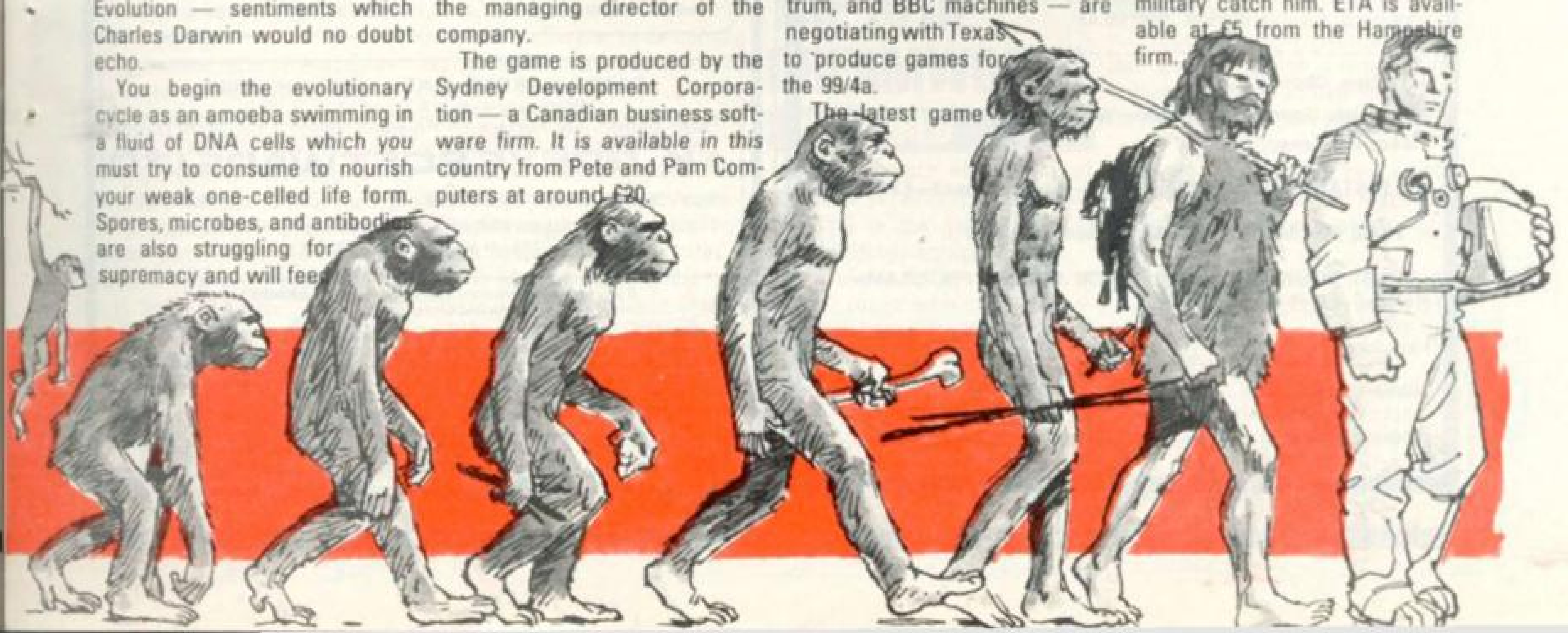
E.T.A.

The game of the film is the latest craze in computer gaming. The theory behind it is that if people will buy the book, record, T-shirt and even jig-saw puzzle of the film then why not buy the game of the film too.

The TV games centre manufacturers were the first into this profitable new business with games for current box office money spinners ET and Tron.

Hot on the heels of Atari's ET comes a version for the Spectrum in 16K and 48K from Automata of Southsea.

ET has crash-landed on Earth and has lost his memory. It's up to you to help him remember his name, and find his space craft before the wild dogs and evil military catch him. ETA is available at £5 from the Hampshire firm.



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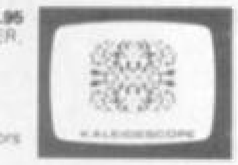

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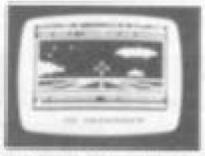

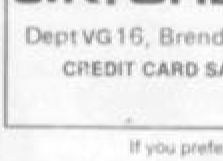

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GAMESNEWS

UP, UP AND AWAY WITH SPECTRUM

FLIGHT SIMULATION

Fly the flag with this latest flight simulation from Psion Software. The game is the most sophisticated flight simulation ever produced for a micro-computer.

It represented a marathon programming excercise for the London based firm. It took over eight thousand man hours to complete with up to six programmers working on the project at any given time.

Many of the features of this flight program are straight from the cockpit of a Boeing 747.

The instrument landing system lines up a flashing dot with a cross which has been centred on the chosen airport.

All information systems are displayed as dials just as in a real plane. These tell you your altitude, rate of climb, speed, wind and weather conditions, and your position.

The game offers two screen presentations. The first of these shows the view from the cockpit with the instruments described above in the bottom of the screen and the view of the horizon in the top half of the screen. As the plane swoops down you can see land and lakes in the horizon appearing in front of you through the cockpit window.

The plane can be made to bank, roll, dive, climb and even loop the loop — though you will have to be a pretty good pilot to make it do this.

The second screen presentation shows a map with you plane flashing its rate of progress. The airports are represented as flashing beacons with the land and lakes shown.

Flight Simulation runs on a Sinclair Spectrum in 48K and is available from larger branches of W. H. Smith at £7.95.

Also new from Psion this month is a second Horace tape. The original Horace game featured the cute comic character running around a park being pursued by the attendants. They were chasing him because the mischievous little glutton had just gobbled their sandwiches and eaten their prize winning daisies.

In this second episode Horace goes ski-ing. You have to get him across a busy road to the hut where he keeps his skis. Hobble back across the road with skis on and Horace can then begin his slide down the snowy slopes. Good luck Horace! Don't fall over!

Horace Goes Ski-ing runs on a Sinclair Spectrum in 16 or 48K and is in W. H. Smith stores now, at around £6.

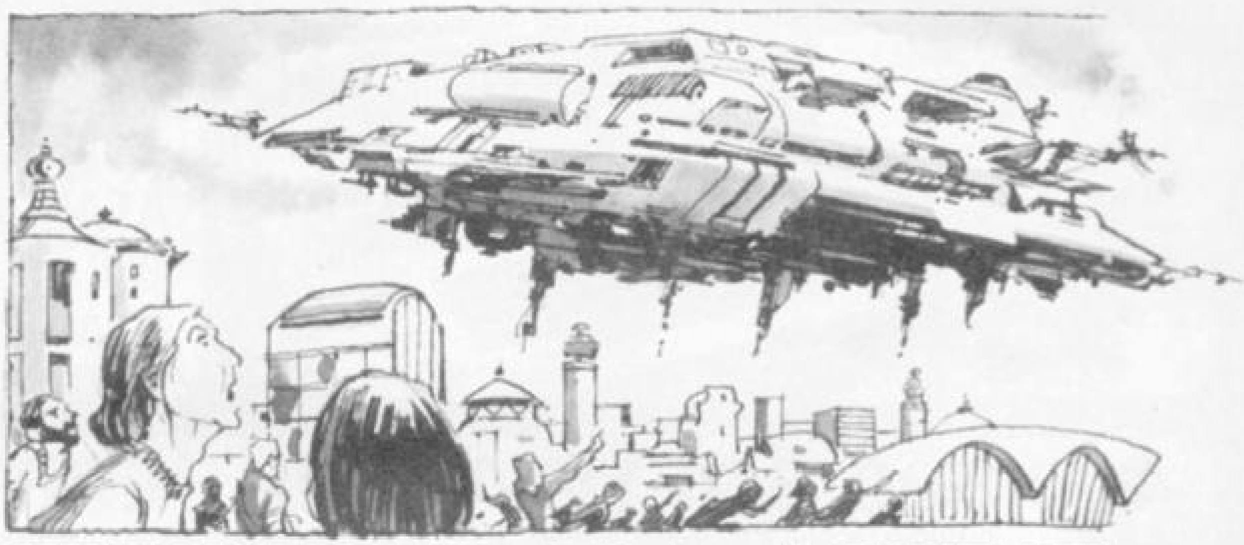

Illustration: Jon Davis

NEWCOMER MEETS OLD FAVOURITES

DRAGON GAMES

A steady trickle of new games manufacturers are beginning to sell games for the new Dragon computer.

Games Pack One — from John Morrison of Glendale Street, Leeds, is an example of some of the new software now coming available. The cassette features five well known games Othello, Awari, Moonlander, Breakout and an original game, Raffles.

Raffles is a mini-adventure game where you have to explore a honeycomb of mysterious rooms searching for treasure.

John Morrison also offers two classic adventure games Stalag, and Worlock.

The above cassettes together with another Games Pack featuring Space Invaders, Lunar Lander, and a Centipede-type game are on sale now from the Yorkshire-based firm at £5.75.

GAME FOR A LAUGH ON THE ZX81

GAMES PACKS

Two new games packs for the ZX81 add another thirteen games to choose from to the now enormous range of games available for the daddy of micros.

Both tapes run on the unexpanded machine in 1K.

Games Pack One features Air Sea Rescue, Invaders, Message Writer, Demon Driver, Breakout and Squash.

Games Pack Two features Jump Jockey, Asteroids, Invaders (part 2), Stunt Cycle, Noughts and Crosses, Enterprise and Sketch.

Both games are available from Database Software of Stoke-on-Trent at £4.75.

DEFENDING THE BLUE DREAMWORLD

OUTWORLD

The architecture of the city of Outworld is amongst the most beautiful in the galaxy. It's tall blue buildings scrape the sky.

The city is the envy of several inferior races who seek to destroy it and deny the Outworldians their utopian life style.

Outworld's chief weakness is that it uses up vast amounts of energy to fuel the buildings and drive the protective force field which blankets the city.

You must provide an escort for the fuel ship and also fight off attacks from hostile aliens. Each time a meteorite hits the force field, more of the city's precious supply of energy is used up.

If an enemy saucer penetrates your defences they will then be able to score a direct hit on Outworld. It only takes one bomb from a barbarian ship to destroy the civilisation.

Outworld is the latest game from Reading-based Audiogenic for the Vic-20. The game is available at £34.95.

DON'T GET CAUGHT ON THE HOP!

FROGS

Ribbit! Ribbit! Hi, my name is Frogs and I've just been hopped out of the arcades to become the latest game for the ZX81.

You can find me on the B side of the latest Psion game called Super Glooper.

Frogs is a version of the popular arcade game Frogger in which you have to hop our hero to the safety of the bank on the other side of the river.

In Super Glooper you must paint in as much of the maze as possible before the guards catch you.

Also new from Psion this month and bringing a touch of arcade action to your ZX81 is Thru the Wall and Scramble.

Thru the Wall is a version of the early arcade hit Breakout.

Super Glooper and Thru the Wall are available from W. H. Smith at £4.95.

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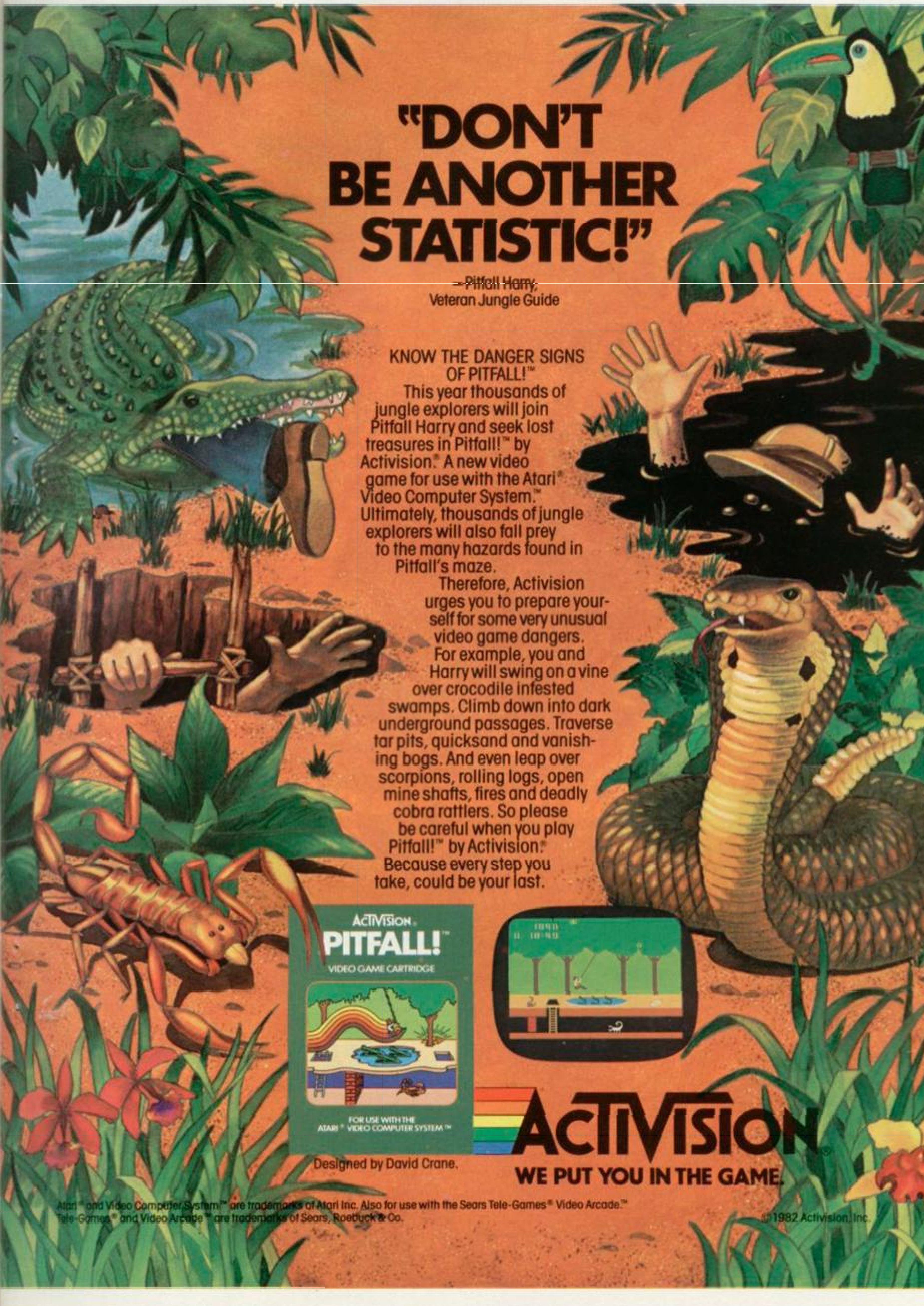
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PRESTEL

THE SHAPE OF THINGS TO COME

Peter Linton takes a break from our Prestel page this month as DAVID BABSKY brings you up to date on a brand new and exciting development — Micronet 800.

Prestel, as you may know by now, was a marvellous idea to send constantly updated information down the phone wire.

A small adaptor was plugged into your office phone line, and it turned telephone signals into the right kind of weak electric currents which you could feed into the aerial socket of an ordinary T.V. set. And the buzzes and whistles which came down the Prestel phone wire reconstituted themselves into pictures on your screen — showing stocks and share prices, or railways timetables, or the day's latest newsflashes.

Now I'm talking about all this in the past tense, because those particular uses of Prestel are rather fading into history.

THE HOOK . . .

Prestel never really caught on with people sitting round the telly at home because static screens of information look rather boring, and there was nothing much on Prestel that you couldn't find out by simply looking in a newspaper — which is far cheaper than the £100-£150 or so which the phone-line adaptors would cost!

But now there's a new home-orientated use for the Prestel idea: instead of just sending pages of information to read off your screen — like the BBC's Ceefax, or ITV's Oracle — it's possible to send home-computer programs down the wire. And to make it cheaper for everyone to hook up to the service, British Telecom and the publishers of *Computer & Video Games*, EMAP have got together to provide a £49.95 phone-to-computer adaptor.

IN THE NET . . .

Programs will be available from January on this new service — which is called Micronet 800. "Micronet" because it'll evolve into a network for microcomputers, and "800" because that's the number which existing Prestel users tap into their keyboard to get to the Micronet area of Prestel.

The first few hundred programs on Micronet 800 will be for the BBC A and B micros, the Apple computers, TRS-80s RML 380/480Z machines, and Commodore Pets.

Phone adaptors for these will be available straight away. And they'll be followed shortly afterwards by programs for the Sinclair machines, as Clive is due to make phone-to-Spectrum and phone-to-ZX81 adaptors available at the beginning of '83.

These adaptors are all (except for the Sinclair versions) what's called "acoustic modems" — acoustic means they operate by sound waves. So there's no direct attachment to the phone line; you just put your telephone receiver into the two plastic cups on the adaptor, and your micro and Prestel then talk to each other just like an ordinary human conversation!

This acoustic coupling cuts out the need to actually have British Telecom come round and add an extra "hard-wire" connection to your telephone system. And it also means there's no chance of any unusual voltages jumping back and forth between your computer and the phone line.

C&VG has come to a deal with Micronet over games programs and any you send in for whatever micro, we will pass onto the Micronet validation team. So, as well as seeing your program published in C&VG, you'll have a chance of earning royalties from Britain's latest electronic magazine.

The choice of programs seems extremely varied: there'll be educational programs to use in schools and colleges, games programs similar to Pacman and space invaders and then out of the home league there'll also be business programs.

Acornsoft have put some of their BBC programs onto Micronet; Bug-Byte, Microdeal and Bridge Software are just some of the firms with ZX81 programs on the system.

These programs — and all the others from major distributors — will cost far less on Micronet than they do if you buy them in a shop or by mail-order.

There are also hundreds of free games on Micronet, and the chance to win big prizes.

THE SYSTEM . . .

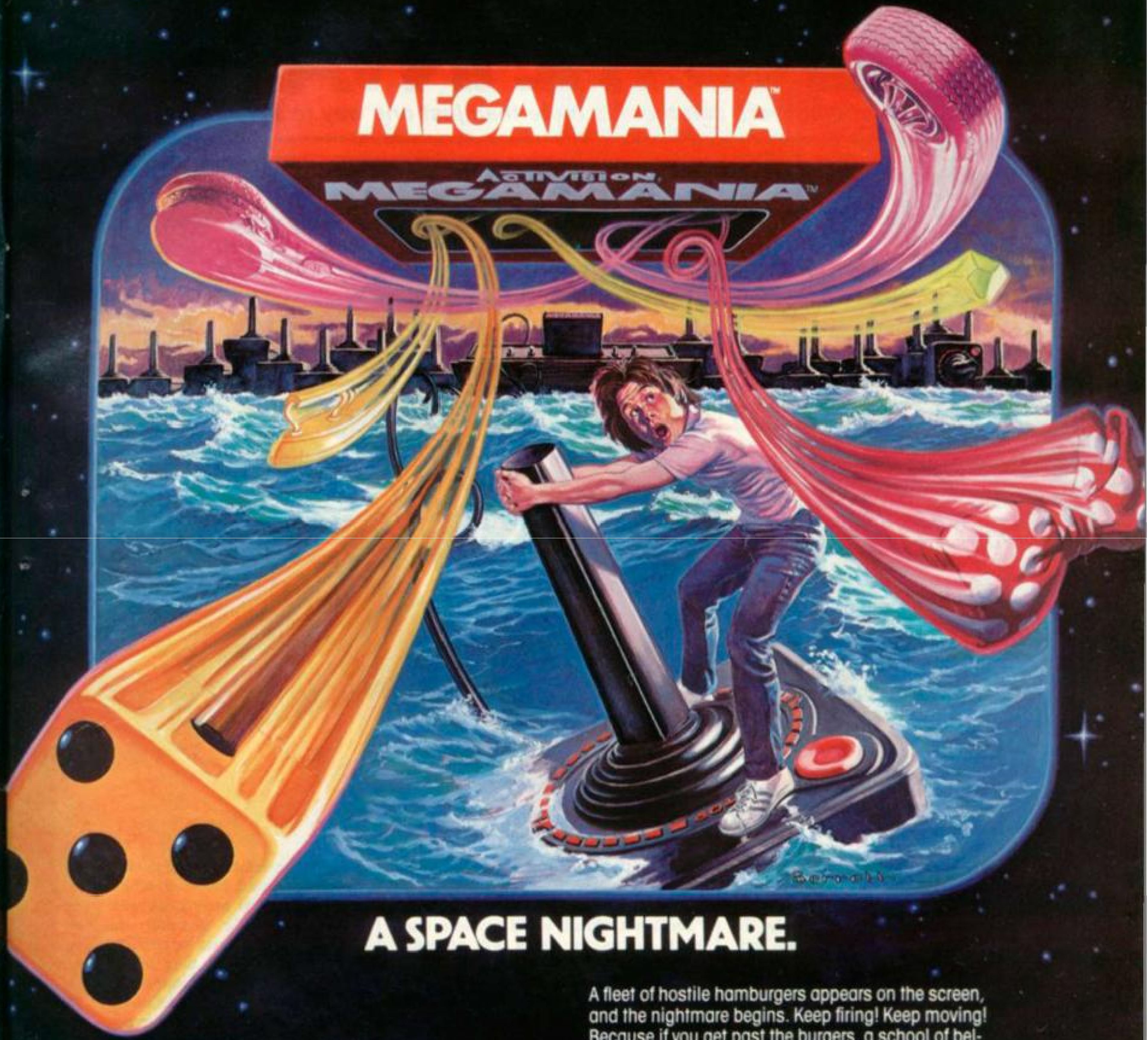
The whole idea of this programs-down-the-phone-line excitement came about through carefully evaluating what goes into a proper purpose-built Prestel reciever.

It has a screen — but so has a home computer. It has an alphanumeric keyboard — and so, too, does every personal computer.

Some Prestel sets, only have a numeric keyboard, and these can't be used for sending messages to other users. With a home computer you can type electronic messages to all or any other Micronet users!)

Home computers also have inbuilt memory, and cassette or disc recorders for storing information — so once a program has come down the line you can keep it for ever! Thus it was just one small logical step from using a home computer to *process* information, to using it to retrieve or receive that games-program information from a central Prestel or Micronet computer.

Incidentally, Micronet are paying a handsome 20% royalty on any programs of yours that they put on the system. Their address is Petersham House, 57a Hatton Garden, London EC1N 8JD.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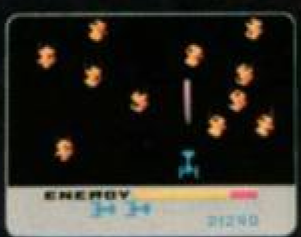
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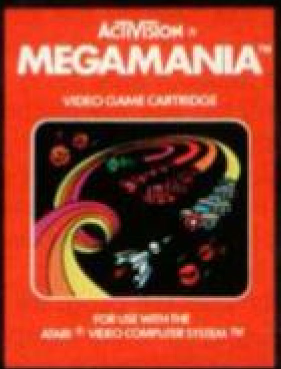
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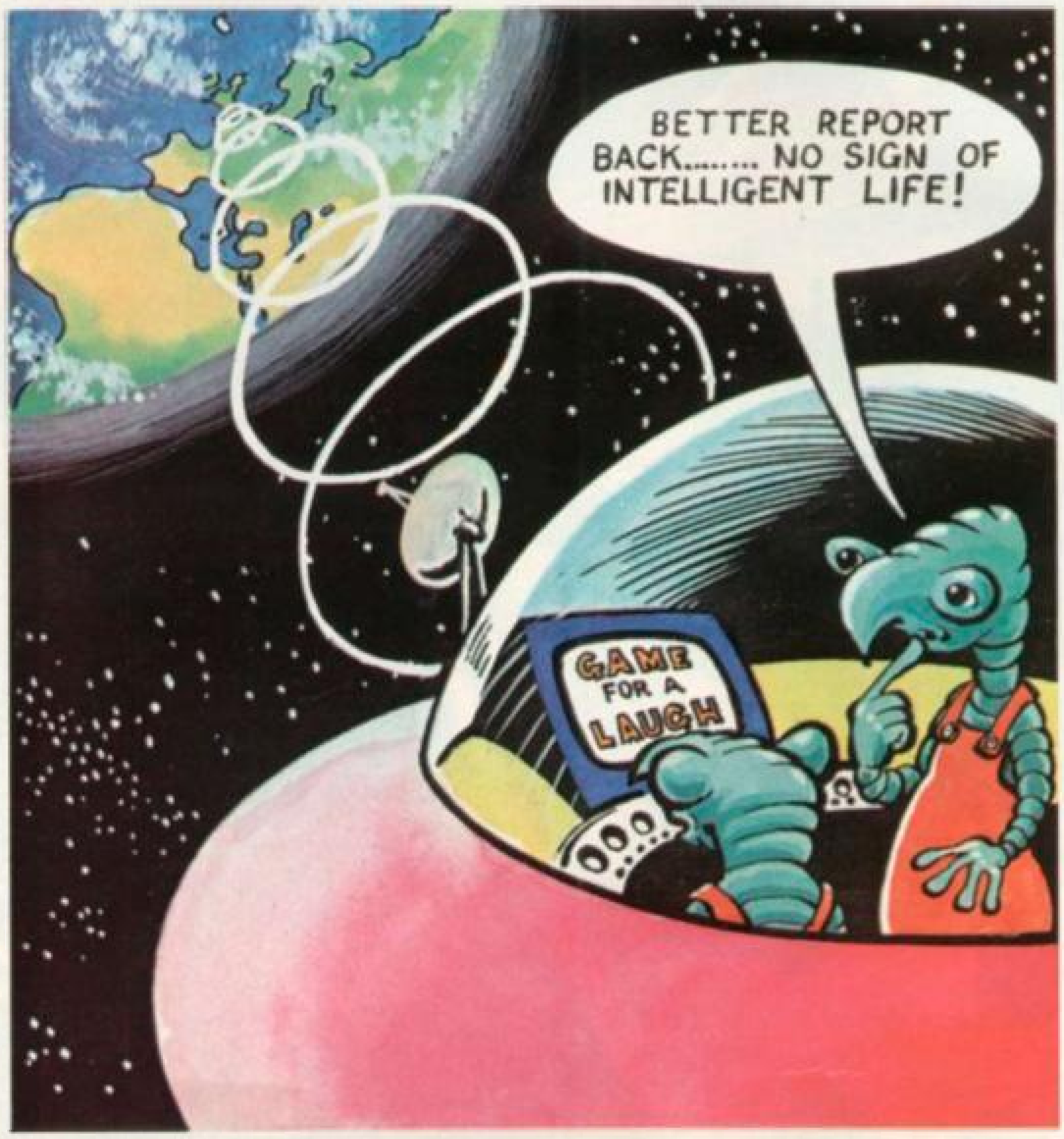
TAMING THE INVADERS

David Langford discovers that there is more than just one way to save planet Earth


BETTER REPORT BACK........ NO SIGN OF INTELLIGENT LIFE!
GAME FOR A LAUGH

Once again those vile space invaders hang in the sky. Once again they throb their evil way downward, and once again it's only your staggering marksmanship which can save Earth from being overrun.

Difficult, isn't it, to read these stirring words without suppressing a yawn? But there may be a new twist to the old game yet.

Since the days of H. G. Wells's *The War of the Worlds*, the trend in science fiction has been for our heroes *not* to zap the alien hordes on sight, but to try and establish some kind of communication.

For some strange reason games programs have lagged behind, perhaps because shooting space invaders seems more exciting, perhaps because it looks more difficult to program for communication.

We can keep the element of threat in a game of communication by remembering all those SF stories in which the tiniest misunderstanding leads to total and terrifying war.

In Joe Haldeman's novel *The Forever War*, it's just a small communication error which causes the thousand-year interstellar war between Us and Them.

A man in one of James White's stories tries to win the favour of cuddly aliens by kissing babies, but unfortunately the aliens assume that this Earthling carnivore is merely *hungry*.

Rather more subtle is *Peace* by Ian Watson, where war is provoked only when humans ask the aliens to agree to a peace treaty.

The aliens' reasoning is, roughly, "If these humans are so barbaric and obsessed with war they need a special treaty to prevent them from fighting, it is clear that they are deeply in need of extermination."

Back to the keyboard. Imagine a program scenario in which an alien fleet advances slowly on you, waiting for intelligent signals but with its patience slowly dwindling, while the only weapon you have is some means of transmitting messages — plus, of course, your own gigantic intelligence.

This is a highly realistic situation, come to think of it. These are all the weapons most of us have against such loathsome beings from beyond the outer galaxies as the Inland Revenue, the Post Office, Customs & Excise . . .

In the listing as given here, you can bash out signals to the alien horde as fast as you like. Every so often another invader joins the fleet in the skies; eventually they'll overrun you by sheer weight of numbers.

But when one of your messages is such that the aliens decide you may be intelligent, they pause and retreat a little.

If you can manage a whole *series* of "intelligent" signals to the invaders, then each successive signal will normally cause a bigger retreat until at last the sky is clear again — but a mistake may set you back to square one! It's up to you, then, to work against time and deduce what sort of simple messages can persuade the aliens to go away.

Beware: there are traps. Because aliens are deeply suspicious of mere repetition — you might only be a parrot — the same message will not work twice.

Obviously you can rewrite the program to change the type of intelligent signal for which it looks. A little study of the listing here will tell you the method used in my prototype program, though it won't help much if you want to cheat: in any case it's more fun to discover these things by playing the game than by analysing the listing.

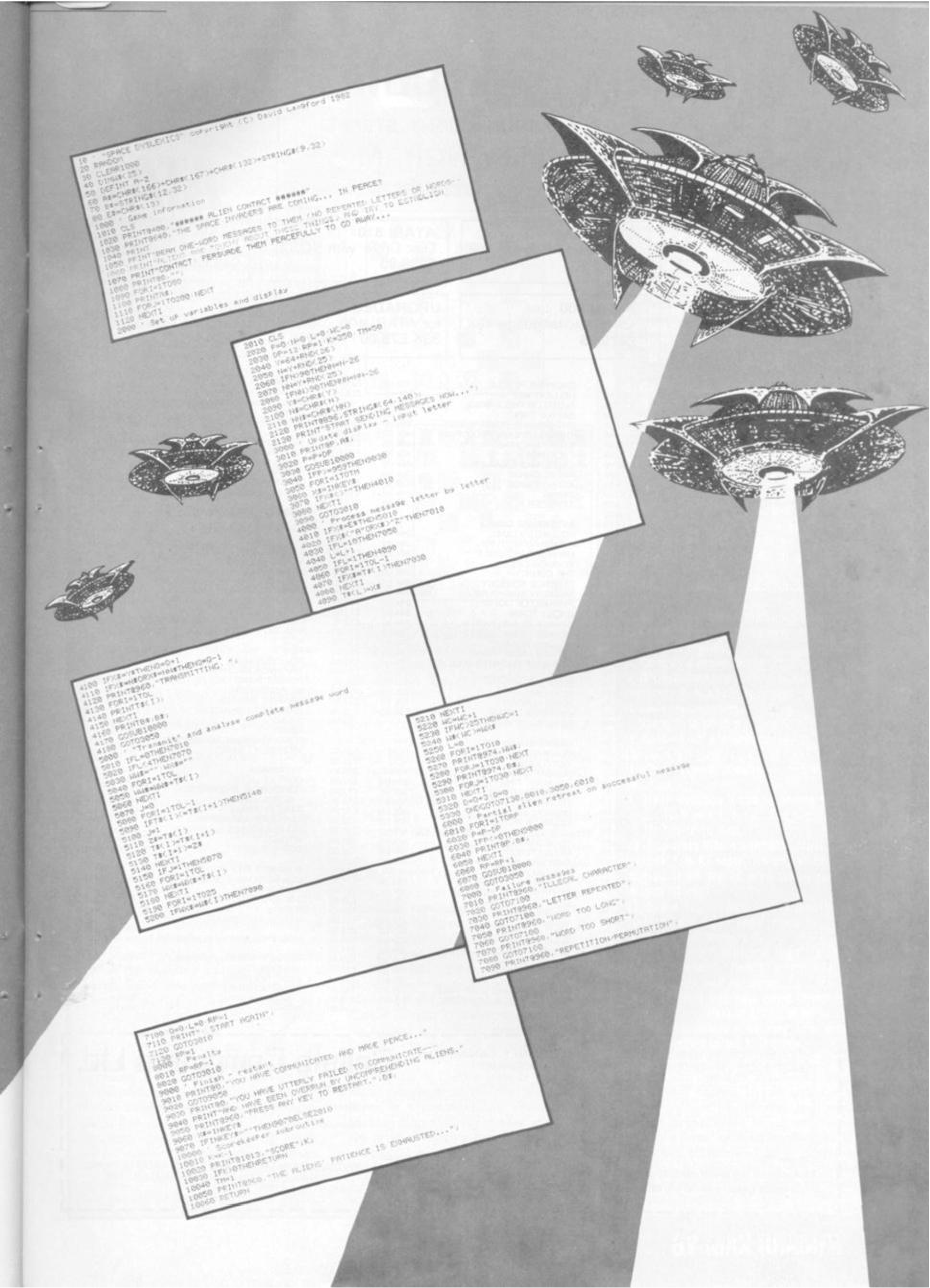
You could easily alter the program to make the key signal a particular computer-generated key word, so the game would become something like Mastermind or Hangman played against time. Or perhaps the aliens themselves could be made to send signals, to which you have to respond, following alphabetical or mathematical sequences which you must get right? Or, ultimately, the computer could generate an artificial alien 'language' in which they talk to you, your job being to decipher enough of it to send peaceful messages back . . . but perhaps the ideas are now getting a bit ambitious for a mere micro.

As usual, the listing is for a TRS-80, level II — but I'm buying another computer soon! As usual, you're encouraged to adapt the program to whatever other machine you may have — there are no particular subtleties.

Note that line 60 puts together the graphics for an invader. To make the game run faster, you can reduce the value of TM in line 2030 — beginners may prefer to increase TM and slow the game down. To increase the playing time — after which the aliens lose patience and swarm over you — increase the value of K in the same line.

So once again the enormous fleet of space invaders darkens the sky. Only *you* can save the Earth from being overrun. From deep in the armoured command base, you aim your mighty radio antenna and type: "Hello . . ."

Cartoon: Terry Rogers. Illustration: Dorian Cross



```
10 ' "SPACE DYSLEXICS" copyright (C) David Langford 1982
20 RANDOM
30 CLEAR1000
40 DIMW$(25)
50 DEFINT A-Z
60 A$=CHR$(166)+CHR$(167)+CHR$(132)+STRING$(9,32)
70 B$=STRING$(12,32)
80 E$=CHR$(13)
1000 ' Game information
1010 CLS
1020 PRINT@400,"###### ALIEN CONTACT ######"
1030 PRINT@640,"THE SPACE INVADERS ARE COMING... IN PEACE!
1040 PRINT
1050 PRINT"BEAM ONE-WORD MESSAGES TO THEM (NO REPEATED LETTERS OR WORDS--
1060 PRINT"ALTER AND "SUCH" ABOUT THESE THINGS), AND TRY TO ESTABLISH
1070 PRINT"CONTACT. PERSUADE THEM PEACEFULLY TO GO AWAY...
1080 PRINT@0,"";
1090 FORI=1TO90
1100 PRINTA$;
1110 FORJ=1TO200:NEXT
1120 NEXTI
2000 ' Set up variables and display
```

```
2010 CLS
2020 P=0:N=0:L=0:WC=0
2030 DP=12:RP=1:K=250:TM=50
2040 Y=64+RND(26)
2050 N=Y+RND(25)
2060 IFN>90THENN=N-26
2070 NN=Y+RND(25)
2080 IFNN>90THENNN=NN-26
2090 Y$=CHR$(Y)
2100 N$=CHR$(N)
2110 NN$=CHR$(NN)
2120 PRINT@896,STRING$(64,140);
2130 PRINT"START SENDING MESSAGES NOW...";
3000 ' Update display - input letter
3010 PRINT@P,A$;
3020 P=P+DP
3030 GOSUB10000
3040 IFP>=959THEN9030
3050 FORI=1TOTM
3060 X$=INKEY$
3070 IFX$<>""THEN4010
3080 NEXTI
3090 GOTO3010
4000 ' Process message letter by letter
4010 IFX$=E$THEN5010
4020 IFX$<"A"ORX$>"Z"THEN7010
4030 IFL=10THEN7050
4040 L=L+1
4050 IFL=1THEN4090
4060 FORI=1TOL-1
4070 IFX$=T$(I)THEN7030
4080 NEXTI
4090 T$(L)=X$
```

```
4100 IFX$=Y$THENQ=Q+1
4110 IFX$=N$ORX$=NN$THENQ=Q-1
4120 PRINT@960,"TRANSMITTING: ";
4130 FORI=1TOL
4140 PRINTT$(I);
4150 NEXTI
4160 PRINTB$,B$;
4170 GOSUB10000
4180 GOTO3050
5000 ' "Transmit" and analyse complete message word
5010 IFL=0THEN7010
5020 IFL<4THEN7070
5030 WW$="":WX$=""
5040 FORI=1TOL
5050 WW$=WW$+T$(I)
5060 NEXTI
5070 J=0
5080 FORI=1TOL-1
5090 IFT$(I)<=T$(I+1)THEN5140
5100 J=1
5110 Z$=T$(I)
5120 T$(I)=T$(I+1)
5130 T$(I+1)=Z$
5140 NEXTI
5150 IFJ=1THEN5070
5160 FORI=1TOL
5170 WX$=WX$+T$(I)
5180 NEXTI
5190 FORI=1TO25
5200 IFWX$=W$(I)THEN7090
```

```
5210 NEXTI
5220 WC=WC+1
5230 IFWC>25THENWC=1
5240 W$(WC)=WX$
5250 L=0
5260 FORI=1TO10
5270 PRINT@974,WW$;
5280 FORJ=1TO30:NEXT
5290 PRINT@974,B$;
5300 FORJ=1TO30:NEXT
5310 NEXTI
5320 D=Q+3:Q=0
5330 ONDGOTO7130,8010,3050,6010
6000 ' Partial alien retreat on successful message
6010 FORI=1TORP
6020 P=P-DP
6030 IFP<=0THEN9000
6040 PRINT@P,B$;
6050 NEXTI
6060 RP=RP+1
6070 GOSUB10000
6080 GOTO3050
7000 ' Failure messages
7010 PRINT@960,"ILLEGAL CHARACTER";
7020 GOTO7100
7030 PRINT@960,"LETTER REPEATED";
7040 GOTO7100
7050 PRINT@960,"WORD TOO LONG";
7060 GOTO7100
7070 PRINT@960,"WORD TOO SHORT";
7080 GOTO7100
7090 PRINT@960,"REPETITION/PERMUTATION";
```

```
7100 Q=0:L=0:RP=1
7110 PRINT"; START AGAIN";
7120 GOTO3010
7130 RP=1
8000 ' Penalty
8010 RP=RP-1
8020 GOTO3010
9000 ' Finish - restart
9010 PRINT@0,"YOU HAVE COMMUNICATED AND MADE PEACE..."
9020 GOTO9050
9030 PRINT@0,"YOU HAVE UTTERLY FAILED TO COMMUNICATE---"
9040 PRINT"AND HAVE BEEN OVERRUN BY UNCOMPREHENDING ALIENS."
9050 PRINT@960,"PRESS ANY KEY TO RESTART.";B$;
9060 X$=INKEY$
9070 IFINKEY$=""THEN9070ELSE2010
10000 ' Scorekeeper subroutine
10010 K=K-1
10020 PRINT@1013,"SCORE";K;
10030 IFK>0THENRETURN
10040 TM=1
10050 PRINT@960,"THE ALIENS' PATIENCE IS EXHAUSTED...";
10060 RETURN
```

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CHESS

Computers are well known to be weak at positional play, the intricate manoeuvring for a small advantage, such as a well-placed Knight. However, they also have problems with tactical play, even with what seems like the simple task of finding forced checkmates in positions where they are known to exist.

Look at figure one. This is an example of a "White to play and mate in two moves" problem of the kind often found in newspapers and magazines.

The first point to note here is that the specification for White to mate in two moves has no practical value. Chess problems are not game positions but artistic compositions on the 64 squares of the chessboard.

Solving a chess problem is not a matter of examining every possible sequence, but of identifying the composers' *theme* in setting the problem.

The use of a computerised "mate in two" program using exhaustive analysis sadly undercuts the aesthetic experience of problem solution.

Simply by considering every possible legal combination of two moves for White and one for Black, the program inevitably reveals the winning move. (The reader is left to discover the solution for figure 1 using either a computer or a human brain, as preferred.)

In finding checkmating sequences in positions that arise in practical play, very different methods need to be applied.

The longest variation in a checkmating sequence arising from play can easily be 7 or 8 moves (of each side) deep, so analysing every possible combination as a general solving method if completely out of the question.

On the positive side, the moves in a checkmating sequence from play are usually fairly obvious ones of a forcing nature, such as checks and captures (or sacrifices of material) whereas those in composed problems are frequently "quiet" or unlikely moves, such as a Bishop move one square further away from the scene of battle, which are difficult to perceive even for strong over-the-board players.

The MATER program of George Baylor and Herbert Simon which appeared in the mid-sixties was an early pioneering attempt aimed at finding forced checkmates in game positions, given that they are known to exist, of necessity employing "Artificial Intelligence" rather than "brute-force" means.

Figure 2 is a fairly straight-forward example of the positions solved by the first version of the program, MATER 1.

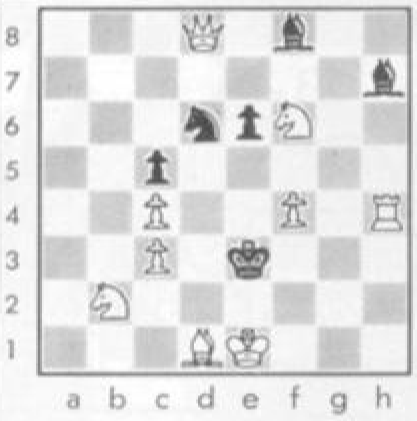
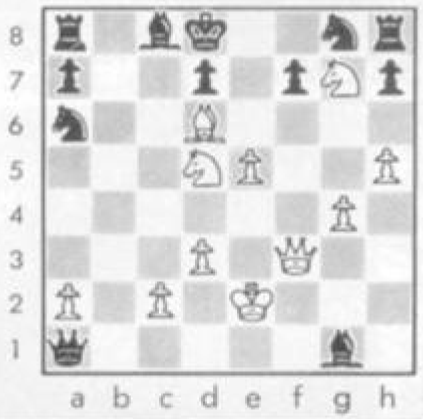


Fig. 1

Fig. 2



The major difficulties with any such program are deciding what moves to consider and in what order, and at any point in the analysis deciding what to examine next.

Deciding when to stop analysing a line is probably the hardest task of all. A badly written program might spend many hours, days, even longer, looking at variations beginning 1. P-QR3, Q-R7; 2. K-Q2, Q-R8; 3. P-R4, etc., which humans would discount at a glance.

MATER's choice of moves to examine is simple but works quite well. At any move for White (assumed to be the winning side), only checks are considered and at every White move preference is given to the check which leaves Black the fewest legal moves in reply.

As will be seen below, this may involve abandoning the current line of analysis and starting another.

Any White moves which give Black more than four legal replies are automatically discarded. Any remaining choice amonst White moves is resolved by giving priority to double checks, then to checks with no capturing replies.

When it is Black's turn to move, all legal moves must be considered, but there is a considerable advantage in looking first at those moves which are the most likely to refute White's attack.

For this reason, MATER looks first at Black moves which capture as valuable a White piece as possible. If there is still a choice, King moves get priority.

This is how MATER solves the position in figure 2.

1. Generate all White checking moves. 1. Q-B6ch has two legal replies. 1. N-K6ch has 3 and 1. B-B7ch and 1. B-K7ch each have one.

2. Choose. 1. B-K7ch (arbitrarily) from the last two for analysis, on the basis of minimising Black's replies.

3. Generate Black's forced reply 1. . . .NxB.

4. Generate all White's checking moves. 2. N-K6ch is the only one and Black has three legal replies.

5. Choose a White move to examine next from those not yet considered. Candidates are 1. Q-B6ch (two replies), 1. N-K6ch (three replies), 1. B-B7ch (one reply) and 2. N-K6ch (three replies).

The 'best' one is 1. B-B7ch so the previously played moves (1. B-K7ch, NxB) are retracted and 1. B-B7ch is played instead from the original position.

6. Black's move is again forced, 1. . . . NxB.

7. Generate White's checking moves. 2. N-K6ch (four legal replies) and 2. Q-B6ch (two replies).

8. Choose a move to consider next, from 1. Q-B6ch (two replies), 1. N-K6ch (three replies), 2. N-K6ch (four replies) and 2. Q-B6ch (two replies).

Since 1. Q-B6ch was generated first, it is chosen in preference to 2. Q-B6ch (both with two legal replies). So 1. Q-B6ch is now played in the *original* position.

9. Black now has a choice of two replies 1. . . . NxQ and 1. N-K2. The capture 1. . . . NxQ is tried first.

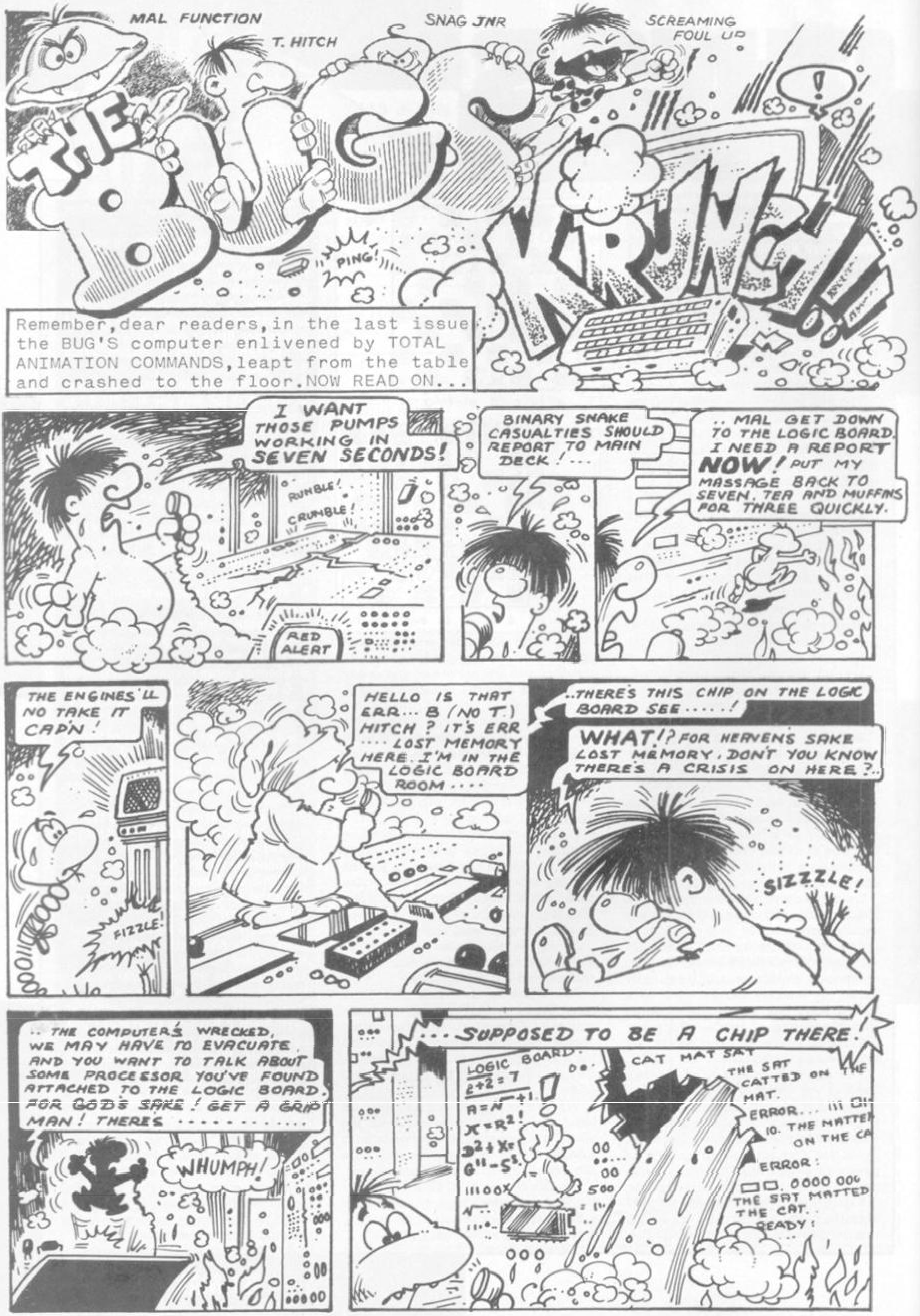
10. Generate White's legal moves; these include 2. B-K7 mate, which has no legal replies at all and is accordingly chosen to look at next.

11. Since 1. . . . NxQ was unsuccessful, Black's only other legal reply to 1. Q-B6ch is tried, namely 1. . . . N-K2.

12. Generates White's legal moves; these include 2. BxNch which has no legal replies and is chosen to consider next. Since it has now been found that neither 1. . . . NxQ or 1. . . . N-K2 avoids checkmate, White's winning first move is established to be 1. Q-B6ch.

Although figure 2 is quite a simple position and one that, in isolation, could have been solved by an exhaustive "mate in two" program, the same method embellished to consider other forcing moves as well as checks for White can solve many other problems for which an exhaustive search method would be completely inadequate in any reasonable amount of time.

BY MAX BRAMER


MAL FUNCTION
T. HITCH
SNAG JNR
SCREAMING FOUL UP
THE BUGS
KRUNCH!!
PING!
I WANT THOSE PUMPS WORKING IN SEVEN SECONDS!
RUMBLE! CRUMBLE!
RED ALERT
BINARY SNAKE CASUALTIES SHOULD REPORT TO MAIN DECK! ...
.. MAL GET DOWN TO THE LOGIC BOARD. I NEED A REPORT NOW! PUT MY MASSAGE BACK TO SEVEN. TEA AND MUFFINS FOR THREE QUICKLY.
THE ENGINES'LL NO TAKE IT CAP'N!
FIZZLE!
HELLO IS THAT ERR... B (NO T.) HITCH? IT'S ERR ... LOST MEMORY HERE. I'M IN THE LOGIC BOARD ROOM ....
..THERE'S THIS CHIP ON THE LOGIC BOARD SEE .....!
WHAT!? FOR HEAVENS SAKE LOST MEMORY. DON'T YOU KNOW THERE'S A CRISIS ON HERE?..
SIZZZLE!
.. THE COMPUTER'S WRECKED, WE MAY HAVE TO EVACUATE AND YOU WANT TO TALK ABOUT SOME PROCESSOR YOU'VE FOUND ATTACHED TO THE LOGIC BOARD. FOR GOD'S SAKE! GET A GRIP MAN! THERE'S ....
WHUMPH!
... SUPPOSED TO BE A CHIP THERE.
LOGIC BOARD.
2+2=7
A=N+1
X=R2!
D2+X=
G11-S2.
111OOX
CAT MAT SAT
THE SAT CATTED ON THE MAT.
ERROR... 111 OI
10. THE MATTER ON THE CA
ERROR:
□□. 0000 006
THE SAT MATTED THE CAT.
READY:

Remember,dear readers,in the last issue the BUG'S computer enlivened by TOTAL ANIMATION COMMANDS,leapt from the table and crashed to the floor.NOW READ ON...

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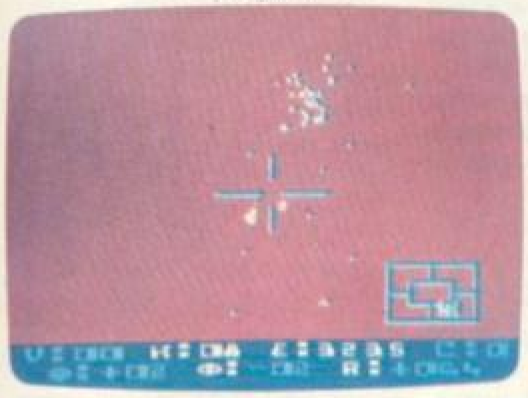
Intro to BASIC 1



Star Raiders

EUROPEAN COUNTRIES
3 AND CAPITALS 3
COUNTRY 4
CZECHOSLOVAKIA
CAPITAL
?

European Countries

Missile Command

HOME
TIME
VISITORS
16
0:00
10

Basketball

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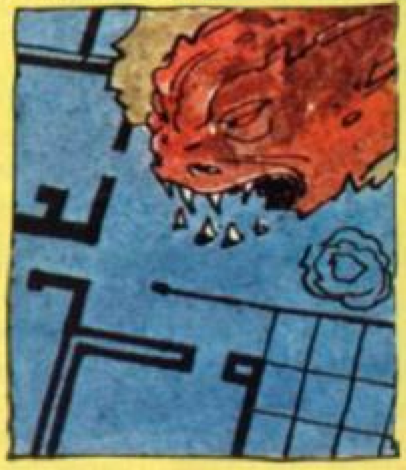
SAVING THE MACHINE ASSEMBLER

BLUEPRINT



What's got a machine, a monster and a beautiful maiden in distress. Blueprint — that's what.

This latest deviation on the maze-game theme is a novel new video which may pick-up some followers around the arcades once they get the hang of just what is going on.

You, the player, control a little chap known as J.J. His job is to assemble a machine which once switched on will save Daisy Damsel from the clutches of Ollie Ogre.

All J.J. has to do is collect all the parts of the machine from little houses situated in a suburban maze, and build them into a "blueprint" at the bottom of the screen. At the top of the screen Ollie Ogre mercilessly chases Daisy — getting closer as you play.

If J.J. enters a house more than once he comes out with more than he bargained for — a fizzing bomb. This he must get rid of before it explodes — hopefully down Ollie's monster hole situated at the bottom right hand side of the screen.

The bombs prevent Ollie's monstrous mates from engaging in the annoying habit of nipping out and bouncing up and down creating a quake which shakes your machine to bits and gives you the assembly job all over again.

There are other dangers for J.J. to overcome, Ollie's mates, Sneaky Peter and Fuzzy Wuzzy appear to chase him around the maze and prevent him completing the machine and saving Daisy.

If J.J. manages to get all the parts in the right place and gets to the machine's on switch then a deluge of beach-balls are fired at Ollie — and if he is hit the story ends happily.

All in all it's a nice game — but you'll need a good few cracks at it before you get the drift of Blueprint.

You've heard of the game of the film — now see the film of the games.

Well, actually it's a video cartridge of a film which seems to have drifted into obscurity after playing second-fiddle to a horror movie while out on general release recently.

Called Arcade Attack it's an interesting semi-documentary concerned with the battle between the merits of pinball and video machines.

There's a lot of classic shots of pinball machines — many loaned by Pinball Owner's Association members — and a fascinating interview with an ace Defender player, who regards the Swarmers, Mutants and other nasties which inhabit this video game as sentient beings.

And finally a charming animated section at the end of the video film which depicts characters from pin table designs fighting it out with video-inspired aliens. £15 for 28 minutes.

THE SEA-SCAPE WITH A 3D FEEL

SUBROC-3D

The third dimension is the current plaything which video game companies are flirting with.

Moving on from the 3D look of Zaxxon comes the 3D feel of Subroc-3D.

This space and sea warfare comes on a stand-up cabinet and a cockpit. Like Battle Zone you have to watch the game through a small binocular eye-panel which opens out onto the main screen.

You look out on a seascape filled with futuristic shipping fleets and a sky inhabited by flying saucers and speeding space ships.

The action appears to you as though you are looking through the cockpit of your Subroc fighter and the screen reacts to your tugs on two handles which pop out periscope-like from the eye-panel.

A fire button lets you reply to the barrage of fire which your ship is undergoing as all sorts of bombs and missiles are hurled towards you: torpedoes thread through the ocean while rockets fill the skies.

The ultimate challenge is the flying Command Ship with its awesome firepower and protective shields.

Stereo sound adds to the effect and so do changes in the skies to show day and night, dawn and dusk backdrops to the action. I found my initial response to be one of confusion, but Subroc-3D is undoubtedly the shape of games to come.

DUAL AERIAL DUELS

JOUST

Take to the air on an ostrich, armed with a lance and battle with a band of buzzard-mounted evil-doers.

Joust takes place in a realm of sheer fantasy and its brand of peculiar aerial combat takes place between either one or two players and the machine.

Dual controls for the duellists encourage the two-player version as higher scores are possible when the players take part in tandem against each other and the machine itself.

Mounted on either an ostrich or a stork, each player mans a flap button and a joystick. He flies his bird towards the enemy riders and attempts to unseat them.

A successful Joust scores points and turns the enemy into an egg which must then be picked up before it hatches into an even more deadly opponent.

The Jousts take place between suspended outcrops of rock over which the combatants flap. Other features include a deadly pterodactyl which swoops down to engage the players; fire consumes the rock bridges leaving less space to land; and a lava troll takes shape, reaching up to grab anything which flies over its den.

The second, seventh, 12th — and so on — waves are termed Survival Waves where players are rewarded for not losing riders and every fifth wave is an egg wave with extra points to be won. Weird and wonderful.

GAPPING GUIDELINES

OUTLINE TIPS

Outline encourages you to improve rapidly as you learn your way around its mazy courses.

Remember that the sparks travel at the same speed you do and when only one is on your trail there should be no problems if you keep moving. He can't catch you up and you can't get trapped anywhere.

Outline offers a joystick and a "gap" button as the controls. The joystick takes some getting used to because it needs constant pressure to keep moving. While the gap button should not be used for the first few screens as it only complicates matters.

Like all maze-games, once you have got a procedure for beating each screen, you should memorise it and stick with it.

Gapping breaks the line behind you but in corners it can lead to problems as you can gap yourself in behind two barriers. The gap lasts for several seconds before the diagram completes itself again.

It is possible to start at different levels in Outline but score and practice suggest it is best to start from the first level. This presents you with a "+" like shape and a single spark. Memorise the spark's early movements and learn just what to expect.

Flashing bonus scores can tempt you off your chosen path and into trouble but are worth three times the score.

The second screen "T" shape only threatens in the long central leg of the "T" where a careless player can get trapped.

The third diagram is the simplest, an "X" shape consists of five squares connected by one solitary line. The best method is to begin at a corner square and when the spark follows you up, leave with a gap behind you, stranding the spark in the corner.

The fourth diagram resembles a distorted "M" and the problems are increased by a second spark. These have a nasty habit of trying to trap you down one of the two long legs of the "M".

When sparks are after you, they tend to follow the "X" co-ordinate first, so a staggered pattern will often cause the spark to career along a horizontal line above you rather than following you down or up.

Another way to take advantage of the spark's no "U" turn policy is to follow behind it.

Wall five features a huge grid covering the whole screen with two sparks. The time bonus will often beat you on this wall.

If you do, then it's back to the "X" shape with two sparks and then onto a distorted "M" with two sparks which fire faster-moving missiles at you.

The game progresses through the missile firing screens onto invisible mazes which only show the scores, not the lines. At wall 13 you are introduced to the rocks which can hide you from the sparks and in the final wall, No. 20, a super fast spark adds to the problems.

QUEST FOR THE RED PLANET

GRAVITAR

You plot your own intergalactic course through Gravitar's deepest space in the quest for the Red Planet.

Your mission is to collect fuel from the minor planets in the solar system and then storm the Red Planet with its subterranean passages.

Gravitar is a new concept in lunar landing games as it shows you progressively closer pictures of your approach to the planet.

In deep space your only worries are the Death Star — which will try to pull you into its field of gravity — and two pursuing craft sent after you by the Red Planet.

If one of these ships should come too close, the screen enlarges to allow you both to manoeuvre in a dogfight.

Arriving at a planet, you screen changes to show a close up of your craft descending. Soon the features of the planet are discernible. These include rocky mountainscapes usually studded with red bunkers which protect the blue fuel cells.

Taking care to avoid the bunkers' fire, you must manoeuvre over the fuel cell and switch on your tractor beam to fill up with fuel.

The tractor button doubles as a shield button to help you repel enemy fire but each time you use it or the thrust button, fuel is depleted.

Points are scored for successfully raiding a planet in the given time limit, destroying enemy bunkers, collecting fuel and shooting red ships.

The Red Planet challenges you to guide the ship down into a spiral cavern where a clock ticks down on a reactor. Having survived the tunnel journey you must blast the reactor and escape from the tunnel, all in under 23 seconds. If the mission is successfully completed you are taken through to another universe.

Gravitar resembles Asteroids in design and controls. With single lines representing planet surfaces, ships and planets. The controls are: buttons for left and right rotation, fire and thrust buttons and a dual purpose, shield/tractor beam button.

A CAST OF MINNOWS

ANGLER DANGLER

Angler Dangler gives every fisherman a chance to see the one that got away.

This fishing game sets you down on a bank with rod and line and a rough idea of where that big fish might lie.

The indication is given on a radar screen which runs the length of the lake and the big fish flash up on it as they swim between the banks of reeds.

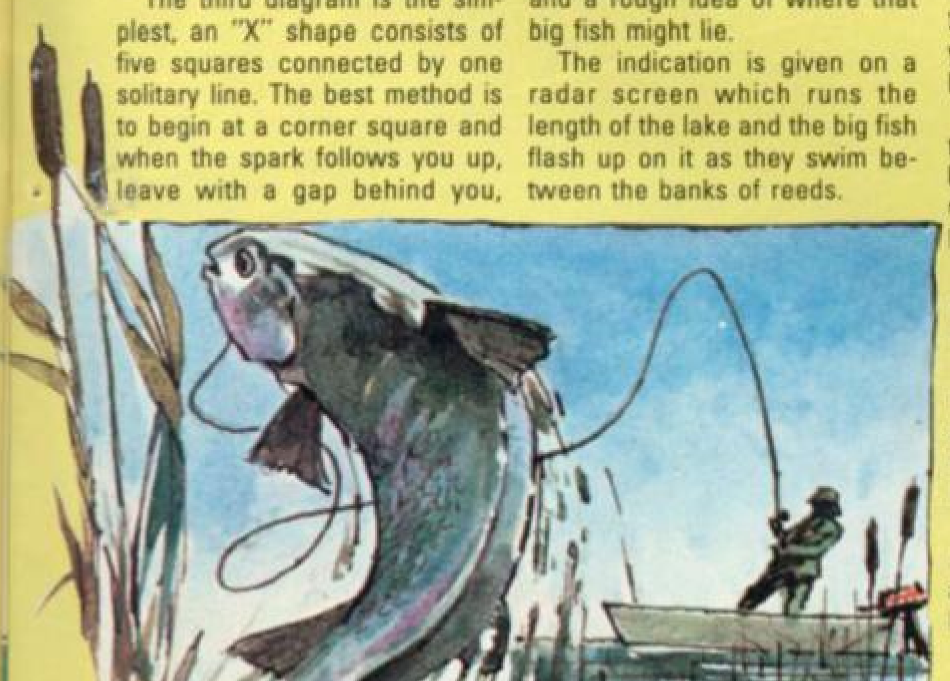
A pointer moves swiftly up and down beside the radar screen and this represents the current length of your cast. By casting as the pointer passes over a fish, you should be able to deliver a hook to the best part of the lake.

The small size tiddlers are fast to react but you can give the larger specimens a better chance of being first onto your hook by pulling it towards him.

With a tiddler on your hook you may decide to cast again by losing the fish in the reeds.

But if you have attracted a real monster then the fight begins, steering him around any obstructions, watch the line tension as he fights and you reel in.

The landing of these large specimens can be quite hard, and you only have so many hooks . . .



Illustrations: Jon Davis

Take-off for far away places with strange sounding names at the controls of a giant Jumbo jet.

Will you be able to pilot the huge jet and land it safely? You'll soon know once you've programmed in this flight simulation which will test your skills to the limit.

By gradually lowering your speed and altitude you have to achieve a safe landing in five sequences. The computer will ask you for the relevant instructions on your run-in to the airstrip. Lowering your airspeed of altitude by too much will cause the jet to stall.

Can you keep the jet and your passengers on the straight and narrow?

There are two skill levels and impressive graphics to enjoy.

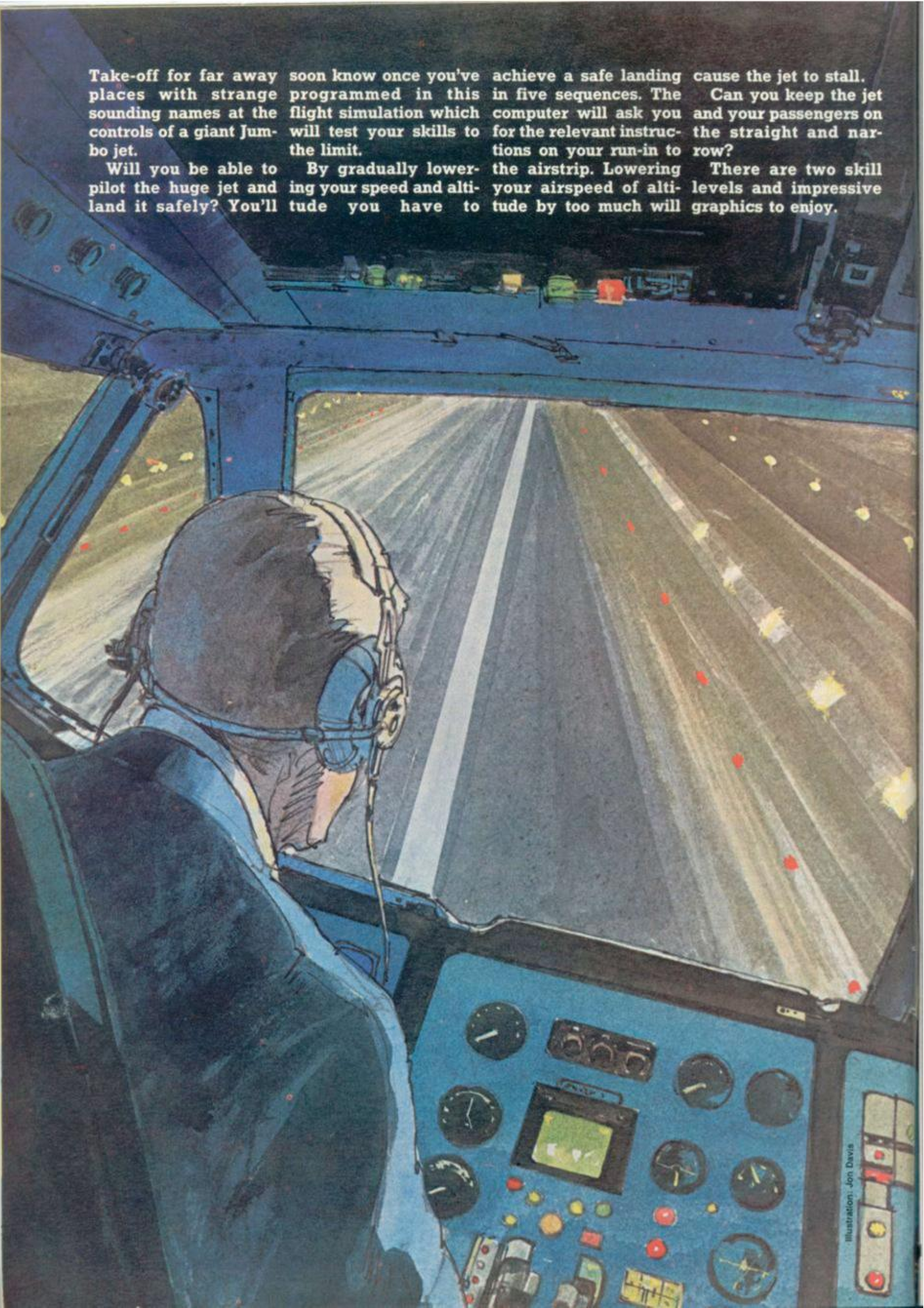


Illustration: Jon Davis

AIRLINE PILOT

BY B. SUMMERHAYS

RUNS ON A SHARP MZ80K IN 32K

```
10 REM COPYRIGHT BY B.SUMMERHAYES 1982
11 REM WHITEWAYS MIDDLE SHEFFIELD 4
20 TI$="000000"
25 PRINT"▩"
30 PRINT"▩▩▩▩▩▩▩▩▩▩▩          AIRLINE PILOT"
40 IF TI$="000004"THEN GOTO 60
50 GOTO25
60 PRINT"▩"
61 PRINT"           AIRLINE PILOT by B.S. "
70 PRINT"                                   "
80 PRINT"You are the pilot of a Jumbo jet."
90 PRINT"▩By gradually lowering speed and"
100 PRINT"▩altitude you must achieve a safe"
110 PRINT"▩landing in 5 sequences.
120 PRINT"▩Wind speed is added onto airspeed "
130 PRINT"in each sequence.A minus windspeed"
140 PRINT"denotes wind against and will slow"
150 PRINT"you down accordingly."
160 PRINT"LOWERING AIRSPEED OR ALTITUDE BY"
170 PRINT"▩TOO MUCH CAUSES A STALL OR A SPIN!"
790 A=INT(RND(10)*1000)+4000
800 PRINT"▩▩PRESS H FOR HARD GAME.N FOR NORMAL"
810 GETZ$
820 IFZ$=""THENGOTO810
830 IFZ$="H"THENA=A+1000
900 TI$="000000"
1000 D=40
1010 W=INT(RND(10)*40)+20
1020 X=INT(RND(10)*6)+1:IFX<3THENW=-W
1030 F=INT(RND(10)*50)+200
1040 S=INT(RND(10)*100)+400
1059 PRINT"▩"
1060 PRINT"          FLIGHT BA 103           "
1070 PRINT"                                  "
1080 PRINT"  ^    ~~~   ~~~ ~~   /~~         "
1090 PRINT"~/ ~~~~~~~~~~~~~ ~~~~~/~~ ~~~      "
1100 PRINT"           /\                     "
1110 PRINT"       ┌┴┐                        "
1120 PRINT"                H                 "
1130 PRINT" _~~~~~~~~~~~~~~~~~~~~~~~~~~~~     "
1140 PRINT"  ~   ~   ~~~   ~    -|\          "
1150 PRINT"______________________▬▬▬▬"
2000 PRINT"DISTANCE":D:"Miles to runway"
2010 PRINT"▩WIND ":W:"knots"
2020 PRINT"▩FUEL LEFT":F:"gallons"
2030 PRINT"▩AIRSPEED":S:"knots"
2040 PRINT"▩ALTITUDE":A:"feet"
2050 S=S+W
2060 PRINT"DECREASE SPEED BY ? KNOTS":INPUTB
2070 S=S-B
2080 F=F-(B/2)
2090 IFB>130THENPRINT"ENGINES STALLED":GOTO7000
2100 FORI=1TO300
2110 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTC
2120 IFC>1500THENPRINT"YOU ARE IN A SPIN"GOTO7500
2130 A=A-C
2140 GOSUB9000
2150 E=INT(RND(10)*10)+1
2160 IFE>6THENA=A+(E*100)
2170 IFE>6THENPRINT"▩SEVERE TURBULENCE YOU MUST
ASCEND ":(E*100):"FEET"
2180 PRINT"┌──────────────────────────────┐"
2190 PRINT"| ~~~~~~~~~~~~~~~~/\/\~~~ \~~~~~~"
2200 PRINT"              /\                 "
2210 PRINT"              ^                  "
2220 PRINT"           '  /  \               "
2230 PRINT"      ┌─┴─┐                      "
2240 PRINT"      |   |            | |       "
2250 PRINT"                        ├┤       "
2260 PRINT"~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~"
2270 PRINT"▩▩DISTANCE 30 miles to runway"
2271 D=30
2280 PRINT"▩WIND SPEED":W:"knots"
2290 PRINT"▩FUEL LEFT ":F:"gallons"
2300 PRINT"▩AIRSPEED":S:"knots"
2310 PRINT"▩ALTITUDE":A:"feet"
2320 PRINT"DECREASE SPEED BY ? KNOTS":INPUTG
2330 S=S-G
2340 IF G>150THENPRINT"ENGINES STALLED"GOTO7000
2350 H=INT(RND(10)*20)+1
2360 W=W+H
2370 S=S+W
2380 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTJ
2385 IFJ>1500THENGOTO7500
2390 A=A-J
2395 GOSUB9000
2400 K=INT(RND(1)*10)+1
2410 IFK<5THENPRINT"YOU HAVE A FUEL LEAK,":
(K*10):"GALLONS LOST"
2420 IFK>5THENPRINT"YOUR HOSTESS HAS
BROUGHT YOUR COFFEE"
2430 IFK<5THENF=F-(K*10)
2440 F=F-(K*8)
2450 IFF<1THENPRINT"NO FUEL LEFT":GOTO8000
2460 PRINT"┌──────────────────────────────┐"
2470 PRINT"                                 "
2480 PRINT" ~~~~ \~~~~~~~/ v \~~~~~~~\/     "
2490 PRINT"        ~~~       ~~~            "
2500 PRINT"              /\▄▟               "
2510 PRINT"              ^                  "
2520 PRINT"             /   \               "
2530 PRINT"        _|_  /..\                "
2640 PRINT"        |  | . . .               "
2650 PRINT"└──────────────────────────────┘"
2660 PRINT"▩ DISTANCE 20 miles"
2670 D=20
2680 W=W+K
2690 PRINT"▩WIND SPEED":W:"knots"
```

?

Don't bother guessing which programs our members are saving money on this month.

If you use a BBC, Dragon, Spectrum, VIC or ZX81 computer and you are not yet a member of THE MICROCOMPUTER SOFTWARE CLUB, then only those with the VIC can be forgiven. We have only just added the VIC to our coverage.

Membership of The Microcomputer Software Club would save you money and trouble. Each month we thoroughly test and evaluate the many programs issued by the growing number of producers - including Pixel, IJK, Bug-Byte, A & F, Campbell, C-Tech, and the smaller companies that you may find it difficult to keep track of. If a program is good, and it has got to be very good, it is recommended to our members in the next issue of the Newsletter.

All the programs that we recommend are made available to our members at very low prices. For example, a Bug-Byte program usually costing £10.00 would be offered to members at £9.00 or less. A saving of at least 10%. Every month we select what, in our opinion, is the overall best program for each computer and this MAIN CHOICE program is offered to members, for one month only, at an average 20% less than the normal price. A MAIN CHOICE program usually costing £6.00 would, therefore, be available to members at about £4.80.

Every month members receive, free of charge, our Newsletter full of information on the programs we have found suitable for recommendation. The range is large, including adventure, arcade, standard games, household, financial, educational, wordprocessing, and utilities. Ordering from the Newsletter is simple and quick and, of course, quality is guaranteed.

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SIGNATURE

```
2700 PRINT"▒FUEL LEFT":F:"gallons"
2710 PRINT"▒AIRSPEED":S:"knots"
2720 PRINT"▒ALTITUDE":A:"Feet"
2730 PRINT"▒DECREASE SPEED BY ? KNOTS":INPUTL
2740 S=S-L
2750 IFL>100THENPRINT"ENGINES STALLED"
2760 IFL>100THENGOTO7000
2770 IFS<50THENPRINT"ENGINES STALLED"
2780 IFS<50THENGOTO7000
2790 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTM
2800 A=A-M
2810 IFA<500THEN GOTO 8000
2820 IF M>1200THENPRINT"YOU ARE IN A SPIN"
2830 IFM>1200THENGOTO7500
2840 F=F-(L/4)
2845 GOSUB9000
2850 N=INT(RND(10)*10)+1
2860 W=W+N
2870 O=N*100
2880 IFN>5THEN PRINT"HEAVY CLOUD:AUTO-PILOT LOSES YOU":O:"FEET OF ALTITUDE"
2890 IFN>5THENA=A-O
2900 IFN<3THENPRINT"FIRE IN NO.1 ENGINE,YOU LOSE AIRSPEED":FORY=1TO2000:NEXT
2910 IFN<3THENS=S-67
2920 IFS<60THENGOTO7000
2930 PRINT"PRESS ANY KEY FOR FINAL APPROACH"
2940 GETZ$
2950 IFZ$=""THENGOTO2940
2960 PRINT"▩"
2970 PRINT"┌────────────────────────────┐"
2980 PRINT"│                            │"
2990 PRINT" ~~~~~/~~~~~/~~~~~^^^~~^ "
3000 PRINT"            / \             "
3010 PRINT"            / \             "
3020 PRINT"           /...\  █         "
3030 PRINT"           /...\ ████       "
3040 PRINT"            .....           "
3050 PRINT"└────────────────────────────┘"
3060 PRINT"▒DISTANCE,10 miles to touchdown "
3070 D=10
3080 W=W-14
3090 PRINT"WIND SPEED":W:"knots"
3100 S=S-W
3110 PRINT"▒FUEL LEFT":F:"gallons"
3120 PRINT"▒AIRSPEED":S:"knots"
3130 PRINT"▒ALTITUDE":A:"Feet"
3140 PRINT"▒DECREASE SPEED BY ? KNOTS":INPUTP
3150 IFP>120THENGOTO7000
3160 S=S-P
3270 IFS<50THENGOTO7000
3280 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTQ
3290 IFQ>1500 THENGOTO7500
3300 A=A-Q
3310 IFA<200THENGOTO7500
3320 F=F-(S/4)
3330 IFF<1THEN PRINT"NO FUEL LEFT"
3340 IFF<1THENGOTO7900
3345 GOSUB9000
3350 E=INT(RND(10)*10)+1
3360 W=W-E
3370 IFE<4THENPRINT"ELECTRIC STORM DETOUR COSTS 54 GALLONS OF FUEL"
3380 IFE<4THENF=F-54
3390 IFE>6THENA=A+500
3400 IFE=5THENPRINT"A HIJACKER HAS BLOWN A HOLE IN THE FUSELAGE"
3410 IFE=5THENFORY=1TO2000:NEXT
3411 IFE=5THENGOTO7500
3420 PRINT"PREPARE TO LAND,PRESS ANY KEY"
3430 GETZ$
3440 IFZ$=""THENGOTO3430
3450 PRINT"▩"
3460 D=0
3470 PRINT"┌────────────────────────────┐"
3480 PRINT"│                            │"
3490 PRINT"│                      ███    "
3510 PRINT"        /   \        ███████ "
3520 PRINT"       /     \       ███████ "
3530 PRINT"       █ ████▙       ██ ███ █ "
3540 PRINT"      /.......\              "
3550 PRINT"      /........\  ▟┐          "
3560 PRINT"└────────────────────────────"
3565 R=E*10
3570 PRINT"RUNWAY BELOW ,▒LANDING SPEED SHOULD BE   ":R:"knots"
3580 PRINT"ACTUAL SPEED IS":S:"knots "
3590 PRINT"▒ALTITUDE SHOULD BE 0 FEET"
3595 D=0
3600 PRINT"▒ACTUAL ALTITUDE IS":A:"Feet"
3600 PRINT"▒ACTUAL ALTITUDE IS":A:"Feet"
3610 F=F-39
3620 PRINT"▒FUEL LEFT ":F:"gallons"
3630 IFF<1THENGOTO7900
3640 PRINT"DECREASE SPEED BY ? knots":INPUTT
3650 IFT>80THEN GOTO7000
```

```
3660 S=S-T
3670 IFS<>RTHENGOTO8000
3680 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTU
3690 IFU>1000THENGOTO7500
3700 A=A-U
3800 IFA<>0THENGOTO8000
3850 GOSUB9000
3900 GOTO5000
5000 PRINT"▣"
5010 PRINT""
5020 PRINT""
5030 PRINT""
5040 PRINT"        WELL DONE!!!!             "
5050 PRINT"▣▣▣A  SAFE LANDING               "
5060 PRINT"▣─────────────────────────────┐"
5070 PRINT" |                            |"
5080 PRINT" |          O                 |"
5090 PRINT"           |●                 "
5100 PRINT"            ▥─O               "
5110 PRINT"            | |               "
5120 PRINT"──────────────────────────────"
```

```
5140 PRINT"YOUR PILOT RATING IS ":TI$:"
     FAULTS.(000000 IS PERFECT)"
5150 PRINT"▣LESS THAN 000120 IS VERY GOOD"
5160 PRINT"▣ABOVE 000500 IS POOR"
5170 PRINT"ANOTHER FLIGHT?"
5180 GETZ$:IFZ$=""THEN GOTO5180
5190 IFZ$="Y"THENGOTO60
5200 IFZ$="N"THENGOTO10000
5230 GOTO10000
7000 PRINT"▣"
7010 PRINT"▣▣▣▣▣EMERGENCY!!!!"
7020 X=53248
7030 POKEX+410,05
7040 POKEX+411,14
7050 POKEX+412,07
7060 POKEX+413,09
7070 POKEX+414,14
7080 POKEX+415,05
7090 POKEX+416,19
```

Illustration: Jon Davis

```
7100 POKEX+417,64
7120 POKEX+418,19
7130 POKEX+419,20
7140 POKEX+420,01
7150 POKEX+421,12
7160 POKEX+422,12
7170 POKEX+423,05
7180 POKEX+424,04
7190 FORW=1TO3000:NEXT
7200 GOTO7800
7490 PRINT"☒"
7500 PRINT"☒"
7501 PRINT"▩▩▩EMERGENCY!!!!"
7510 PRINTTAB(10):"▩▩RATE OF DESCENT TOO GREAT"
7520 PRINTTAB(15):"▩▩YOU ARE IN A SPIN "
7522 TEMPO7
7523 MUSIC"‾B‾A‾G‾F‾E‾D‾CBAGFEDC_B_A_G_F_E_D_C"
7530 FORW=1TO3000:NEXT
7800 PRINT"☒"
7810 E=INT(RND(10)*8)+1
7811 PRINT"▩▩▩     DONT PANIC!!!"
7815 PRINT"▩▩▩PANIC BUTTON"
7816 PRINT"    ______________"
7817 PRINT"▩ONE AND ONLY ONE OF THE NUMBER"
7818 PRINT"▩BUTTONS WILL SAVE YOU"
7819 PRINT"▩PRESS ONE NOW (1TO 9)":INPUTZ
7830 PRINTZ
7840 IFZ=ETHENPRINT"YOU ARE BACK ON COURSE"
7845 IFZ=ETHENFORY=1TO3000:NEXT
7850 IFZ=ETHEN A=4000
7855 IFZ=ETHENGOTO900
7860 IFZ<>ETHENPRINT"HARD LINES,IT WAS":E:"THIS TIME!"
7865 FORW=1TO2000:NEXT
7870 GOTO8000
7900 PRINT"☒"
7905 PRINT"▩▩▩▩▩▩    NO FUEL LEFT     "
7910 PRINT"         ____________     "
7915 PRINT"DONT START READING ANY LONG BOOKS"
7916 PRINT"▩▩ALL POWER LOST,ALL ENGINES DEAD"
7920 FORW=1TO3800:NEXT
8000 PRINT"☒"
8010 Y=INT(RND(10)*4)+1
8020 IFY=1THENY$="INTO THE SEA"
8030 IFY=2THENY$="INTO A MOUNTAIN"
8040 IFY=3THENY$="INTO A SEWAGE WORKS"
8050 IFY=4THENY$="INTO A CONCRETE FACTORY"
8060 IFY=5THENY$="INTO A CUSTARD FACTORY"
8070 PRINT"▩▩▩▩▩     DISASTER!!!!       "
8080 PRINT"    _________________       "
8090 PRINT"▩▩▩▩▩YOU HAVE CRASHED ":Y$:" AND ITS A MESS."
8091 PRINT"▩▩To say the least!"
8092 TEMPO6
8093 MUSIC"C6R2C4R1C4R1C6R1#D4R1D4R1D4R1C4R1C4_B4R1C6"
8100 PRINT"▩▩▩TRY AGAIN?"
8200 GETZ$:IFZ$=""THENGOTO8200
8300 IFZ$="Y"THEN GOTO 60
8350 GOTO10000
8375 PRINT"☒"
9000 PRINT"☒"
9010 PRINT"  VIDEO SIMULATION-SIDE VIEW  "
9020 PRINT"_____________________________"
9030 PRINT""
9031 PRINT""
9032 PRINT""
9033 PRINT""
9034 PRINT""
9035 PRINT""
9036 PRINT""
9037 PRINT""
9038 PRINT"~~/\~                            "
9039 PRINT"      \__________n_._H_~~~~~~~~~"
9050 PRINT"   MTS                    SEA   "
9060 PRINT"          RUNWAY                "
9070 E=53248
9075 USR(62)
9080 IFD<41THENPOKEE+315,196
9081 USR(62)
9090 IFD<31THENPOKEE+345,196
9091 USR(62)
9100 IFD<21THENPOKEE+380,196
9101 USR(62)
9200 IFD<11THENPOKEE+418,196
9201 USR(62)
9300 IFD<1THENPOKEE+495,196
9301 USR(62)
9350 FORN=1TO4000:NEXT
9375 PRINT"☒"
9400 RETURN
10000 PRINT"☒▩▩▩▩▩▩▩▩▩▩▩THANK YOU FOR FLYING WITH US,GOODBYE."
10010 PRINT"☒"
10020 GOTO10000
10040 END
```

BY R. M. STEVENSON

Golf

RUNS ON A BBC MODEL B IN 32K

"Fore! Ah, hello old chap. Out for a spot of golf then eh? Wonderful sport, what! Lots of fresh air and exercise. But sometimes you will find yourself stuck in the office for an afternoon. Or the weather will be so absolutely foul you won't be able to even lift a club for days!

That's where these computer chappies come in useful. They've got golf off to a tee on the old micro. Jolly good when you can't get down to the links . . . oh, excuse me, jolly old ball seems to have got lodged in the branches of that pine tree. Bye for now!"

This program includes all the elements of the real game. Bunkers, greens, and even the dreaded "rough". You can tell the computer how many holes you wish to play and it sets up the course for you.

It will ask you which direction you wish to make your shot to the green, and how hard you wish to hit the ball. The direction is calculated from 0 to 12 as in the hands of a clock, and strength by inputting a value from 0-100 which will represent the distance the ball travels in yards.

If you get into the trees you incur a penalty shot. If you get stuck in the rough you will have to hit your ball four times as hard as normal. If you land in a bunker you'll need to adjust your hitting power up to five times more than normal.

Good luck, good hitting, and we'll see you back at the clubhouse!

The following alterations are required to run the program on a model A machine.

Change line 10 and 110 to read MODE 4. Change line 115 to read COLOUR 1. In lines 120, 121 and 123 remove all the COLOUR statements and the colons immediately following them. Change line 270 to read COLOUR 1.

In line 1020 remove the COLOUR 0 statement and the colon immediately following it. Change the MODE 1 and COLOUR 2 statements in line 1340 to read MODE 4 and COLOUR 1 respectively.

```
  10MODE1
  20VDU23,255,24,60,126,60,24,24,24,24
  30VDU23,254,153,219,90,60,60,24,24,24
  40VDU23,253,90,255,126,124,62,126,255,102
  50VDU23,252,28,60,124,12,12,12,12,12
  60VDU23,250,126,129,189,161,161,189,129,126
  70VDU23,251,0,0,0,0,24,60,60,24
  80PRINTTAB(18)"GOLF"'TAB(18)"____"!PRINT:PRINTTAB(5)CHR$(250)" R.M.STEPHENSON
 (1982)"
  90PRINTTAB(5,5)"Do you want instructions(Y/N)?";:A$=GET$:IFLEFT$(A$,1)<>"Y"TH
EN130
 100GOSUB 1360
 110MODE1
 115COLOUR2
 120PRINT:PRINT:PRINTTAB(5);:COLOUR3:PRINT"'|' ";:COLOUR2:PRINT"represents the
hole"''TAB(5);:COLOUR3:PRINT"'";:COLOUR1:PRINT")";:COLOUR3:PRINT"' ";:COLOUR2:PR
INT"represents a bunker"''TAB(5);:COLOUR3:PRINT"'^' ";:COLOUR2:PRINT"represents
the rough"'
 121PRINTTAB(5);
 123COLOUR3:PRINT"'";:COLOUR131:COLOUR0:PRINT"";:COLOUR3:COLOUR128:PRINT"'";:CO
LOUR2
 125COLOUR128:PRINT" represents a tree"''TAB(5);:COLOUR3:PRINT"'C' ";:COLOUR2:P
RINT"represents your ball"
 130RUF=0:BUNKER=0
 150SH=0:COURSE=0
 160SP$="                                          "
 180PRINT:PRINT:PRINTTAB(12):INPUT"HOW MANY HOLES DO YOU WISH TO PLAY ?"H
 190FORCOE=1TOH
 200VDU19,2,2,0,0,0
 210COLOUR 130
 220CLS
 230PAR=RND(3)+2
 240YARDS=RND(100)+PAR*50
 250X=2:Y=5
 260FORTREES=1TO7
 270      COLOUR0
 280A=RND(27)+5:B=RND(23)
 290FORLM=0TORND(4):PRINTTAB(A+LM,B)"":IFRND(2)=1THENNEXTLM ELSE PRINTTAB(A+LM+
1,B+1)" ":NEXTLM
 300FORLM=0TORND(6):PRINTTAB(A+LM,B+1)"";:IFRND(2)=1THENNEXTLM ELSE PRINTTAB(A+
LM+1,B+1)" ":NEXTLM
 310FORLM=0TORND(3):PRINTTAB(A+LM,B+2)"":IFRND(2)=1THENNEXTLM ELSE PRINTTAB(A+L
M+1,B+2)" ":NEXTLM
 320NEXTTREES
 330GOTO430
 340COLOUR1
 350FORBUNKER=1TO2
 360V=RND(2):IFV=1THENV=GRY-RND(3)
 370IFV=2THENV=GRY+RND(3)
 380N=RND(2):IFN=1THENN=GRX-RND(3)
 390IFN=2THENN=GRX+RND(2)
 400PRINTTAB(N,V)"))"
 410NEXTBUNKER
 420GOTO480
 430STRFACT=YARDS/40
 440GRY=7:GRX=YARDS/STRFACT-5:GRY=GRY+RND(8)
 450COLOUR1
 460COLOUR3:PRINTTAB(GRX,GRY)"|"
 470GOTO340
 480COLOUR3
 490GRA=GRX-3:GRB=GRY-2
 500COLOUR3:PRINTTAB(GRX,GRY)"|"
 510FORROUGH=1TO4
 520COLOUR7
 530W=RND(30):Q=RND(23)
 540PRINTTAB(W,Q)"^^^^"
 550PRINTTAB(W,Q+2)"^ ^^^"
 560NEXTROUGH
 570COLOUR3
 580 COLOUR3:PRINTTAB(GRX,GRY)"|"
 590MK=3:FORLS=5TOGRY
 600PRINTTAB(MK,LS)" "TAB(MK,LS-1)" "TAB(MK,LS-2)" "TAB(MK,LS+1)" "TAB(MK,LS+2)
" "
 610MK=MK+1:NEXTLS
 620FORKH=GRX-MK-1 TO GRX-7
 630PRINTTAB(KH,GRY)" "TAB(KH,GRY-1)" "TAB(KH,GRY+1)" "
 640NEXTKH
 650REM***COURSE SET UP,NOW PRINT      DETAILS AND INPUT MOVE
 660COLOUR3
 670PRINTTAB(X,Y)"C"
 680COLOUR1
 690IF COURSE=0 THEN A$="EVENS":GOTO720
 700IF ABS(COURSE)<>COURSE THEN A$=STR$(ABS(COURSE))+" UNDER"
 710IF ABS(COURSE)=COURSE THEN A$=STR$(ABS(COURSE))+" OVER"
 720 COLOUR3:PRINTTAB(0,1)"PAR ";PAR;"   ";YARDS;" YARDS";"   COURSE PAR :";A$;
TAB(2,27)"SHOTS : ";SH'TAB(2)"HOLE : ";COE'TAB(2)"COURSE LENGTH ";H;" HOLES"
 730PRINTTAB(2,30)"DIRECTION (0 TO 12)";:INPUTANG
 740IFANG>12 OR ANG<0.1 THENPRINTTAB(2,30)SP$:GOTO730
 750PRINTTAB(2,30)SP$;TAB(2,30)"STRENGTH(0 TO 100)";:INPUTS
 760IF RUF=1 THEN RUF=0:S=S/4
 770IF BUNKER=1 THEN BUNKER=0:S=S/5
```

Illustration: Dorian Cross

MYSTERIOUS ADVENTURES

FOR BBC MICROCOMPUTER MODELS A & B*

Join the growing band of Adventurers who are enjoying these absorbing and stimulating programs. Step into another world of Fantasy, Magic, Mystery and Sorcery. Only your wits and cunning can ensure success in these scenarios!

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- **SAVE GAME FEATURE.**
- **SPLIT SCREEN DISPLAY.**

1. THE GOLDEN BATON — Venture into a strange province of Sorcery and Evil Magic to recover the Golden Baton, a priceless artifact whose powers are said to bring great Health and Prosperity to the Land.
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* Adventures 5, 6 and 7 require 32K RAM.

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```
780PRINTTAB(2,30)SP$
790IFS>100THENS=100
800S1=40/YARDS
810S=S*S1
820PRINTTAB(X,Y)" "
830ANG=ANG*(PI/6)
840X=X+S*SIN(ANG)
850Y=Y-S*COS(ANG)
860SH=SH+1
870IFX>39THENX=39
880IFX<0THENX=0
890IFY<0THENY=0
900IFY>25THENY=25
910A$=FNREADCH(X,Y)
920IF A$="|"THENGOTO970
930IF A$=""THENGOTO1090
940IF A$="^"THENGOTO1150
950IF A$=">"THENGOTO1210
960GOTO0670
970TOT=PAR-SH
980COURSE=COURSE-TOT
```

```
 990IFABS(COURSE)=COURSE THENA$=STR$(COURSE)+" OVER"
1000IF COURSE=0 THENA$="EVENS"
1010IFABS(COURSE)<>COURSE THENA$=STR$(ABS(COURSE))+" UNDER"
1020COLOUR0:PRINTTAB(5,15);"CONGRATULATIONS!YOU HOLED IT IN ";SH'"      THAT TAK
ES YOU TO ";A$
1030FORA=1TO8000:NEXT
1040SH=0
1050IF H=1 OR H=0 THEN1270
1060CLS
1070PRINTTAB(0,30)SP$;TAB(0,31)SP$
1080IFCOE=H THEN1270 ELSE NEXT COE
1090PRINTTAB(0,30)"IN THE TREES - PENALTY SHOT"
1100SH=SH+1
1110PRINTTAB(X,Y)"C"
1120FORA=1TO8000:NEXTA
1130PRINTTAB(0,30)SP$
1140GOTO0960
1150PRINTTAB(0,30)"IN THE ROUGH"
1160PRINTTAB(X,Y)"C"
1170FORA=1TO8000:NEXTA
1180PRINTTAB(0,30)SP$
1190RUF=1
1200GOTO960
1210PRINTTAB(0,30)"BUNKERED - A CHIP SHOT IS NEEDED"
1220PRINTTAB(X,Y)"C"
1230FORA=1TO10000:NEXTA
1240PRINTTAB(0,30)SP$
1250BUNKER=1
1260GOTO960
1270CLS
1280IFABS(COURSE)=COURSE THEN A$=STR$(COURSE)+" OVER FOR THE COURSE"
1290IFCOURSE=0THENA$="EVEN PAR FOR THE COURSE"
1300IF ABS(COURSE)<>COURSE  THEN A$=STR$(ABS(COURSE))+" UNDER FOR THE COURSE"
1310MODE7:PRINT:PRINTTAB(14);CHR$(129);CHR$(141);"GOLF"'TAB(14);CHR$(129);CHR$(
141);"GOLF"
1320PRINTTAB(15);CHR$(129);"____"
1330PRINT:PRINT:PRINTCHR$(130);CHR$(141);"YOU ENDED UP ";A$';CHR$(130);CHR$(141
);"YOU ENDED UP ";A$
1340PRINT:PRINT:PRINT:PRINTTAB(5)"ANOTHER GAME (Y/N)?";:A$=GET$:IFLEFT$(A$,1)="
N"THEN END ELSEPRINT:PRINTTAB(5)"DO YOU WANT INSTRUCTIONS(Y/N)?";:A$=GET$:IF A$=
"Y" THEN GOTO100 ELSE MODE1:COLOUR2:GOTO130
1350END
1360MODE7:PRINT:PRINTTAB(14);CHR$(129);CHR$(141);"GOLF"'TAB(14);CHR$(129);CHR$(
141);"GOLF"
1370PRINTTAB(15);CHR$(129);"____"
1380IS$="When the computer asks you for your      'DIRECTION',you must type in a
 number   between 0 and 12(as in hands of a clock)(decimals are allowed).
         "
1390I2$="When it asks for strength,your input    (0 to 100),represents how far
the ball  will travel in yards.(but remember that the actual distance it travels
 on the   screen will be proportionate to the    length of the hole)."
1400I3$="You must avoid the trees,because when   they are hit,they cause you to
 incur a  penalty shot.Also to be avoided is the rough,as your hitting power is
severely reduced (you will need about four times normal hitting power)."
1410I4$="When in a bunker,you will need to hit   the ball five times as hard as
 usual."
1420FOR SY=1TO LEN(IS$):PRINT MID$(IS$,SY,1);:SOUND0,-10,1,1:FORA=1TO150:NEXTA:
NEXTSY:FORGR=1 TO LEN(I2$):PRINTMID$(I2$,GR,1);:SOUND0,-10,1,1:FORA=1TO150:NEXTA
:NEXTGR
1430 PRINT':FORNS=1 TO LEN(I3$):PRINT MID$(I3$,NS,1);:SOUND0,-10,1,1:FORA=1TO15
0:NEXTA:NEXTNS:PRINT':FORNS=1 TO LEN(I4$):PRINT MID$(I4$,NS,1);:SOUND0,-10,1,1:F
ORA=1TO150:NEXTA:NEXTNS
```

```
1440FORLX=1TO5000:NEXT:RETURN
1450END
1460DEF FNREADCH(X,Y)
1470X=INT(X):Y=INT(Y)
1480LOCAL A%,LASTX,LASTY,C
1490LASTX=POS
1500LASTY=VPOS
1510VDU31,X,Y
1520A%=135
1530C=USR(&FFF4)
1540C=C AND &FFFF
1550C=C DIV &100
1560VDU31,LASTX,LASTY
1570= CHR$(C)
```

BY STEPHEN SHAW

POMPEII

RUNS ON A T.I. 99/4 OR 99/4A IN 16K IN EXTENDED BASIC

In the ashes of Pompeii, the ancient Roman city devastated by a volcano, some gaming counters, in the shape of trussed up chickens, were found. There appear to have been 15 counters in a set with Roman numerals I to XV on one side and the other blank. Historians think that they may have been used with a box with 12 compartments.

Stephen Shaw has delved back into history for this latest brain-teasing program — based on an adaptation of the ancient Roman game produced by Whittlecraft of Worcester.

Rules of the game are included as DATA statements in the program and, says Stephen, should be sufficient for play.

Program notes:

120: Reruns program in case of serious errors-eg, syntax errors. You are advised to insert this line ONLY when the program has proved to be running OK. Otherwise you miss the error messages!-

140: Warning messages are not displayed — the program will continue. BREAK is not totally disabled but can only be used when the machine is waiting for an input.

180: Defines characters 100-102 as the horizontal and vertical lines of the grid and the connecting points (102).

210: VALIDATE will only permit you to enter a Y or N. If you just press ENTER an N is assumed in this prog.

240: Draw 4 horizontal lines

250: Draw 5 vertical lines

270: Put a + in where they join.

280-300: Put the numbers 1-12 in the boxes

320: Display the counter numbers on the left hand side of screen

330-340: General screen information

350: CT (x,1)= numbered side of counter
CT (x,2)= blank side of counter
CTR (x,1)= result of throw
CTR(x,2)= has counter been thrown this round?
Both ctr(x,1) and ctr(x,2) are here set to record the result of the throw, which is then displayed.
(For other computers use CTR(X,1) =CT(etc) ::
CTR(X,2)=CTR(X,1) if you dont have multiple assignments)

360: Tells comp all compartments are free for use.

380: When necessary changes the player (P).

430: Checks to see if counter can be used

490: If only one counter is to be used checks to see if compartment can be used.

500: Tells computer the compartment has been used and deletes the compartment number from the screen. Arrays RR(n) and cc(n) contain the screen locations of the compartment number n.

620-630: Reset counters ONE & TWO as appropriate if they cannot be used.

660: Have all faceup counters been used (if so TOT=0).

680: Rethrow any counters which have not yet landed number up in this round.

700-720: Have NO counters landed face up this time? Then score . . Scoring routine- total value of unused faceup counters goes to TOT while total value of unused compartments goes to TBX

790-800: If one score exceeds 100 *and* player 2 has just completed a round ((ensures no disadvantage to player 1)) then evaluate the scores.

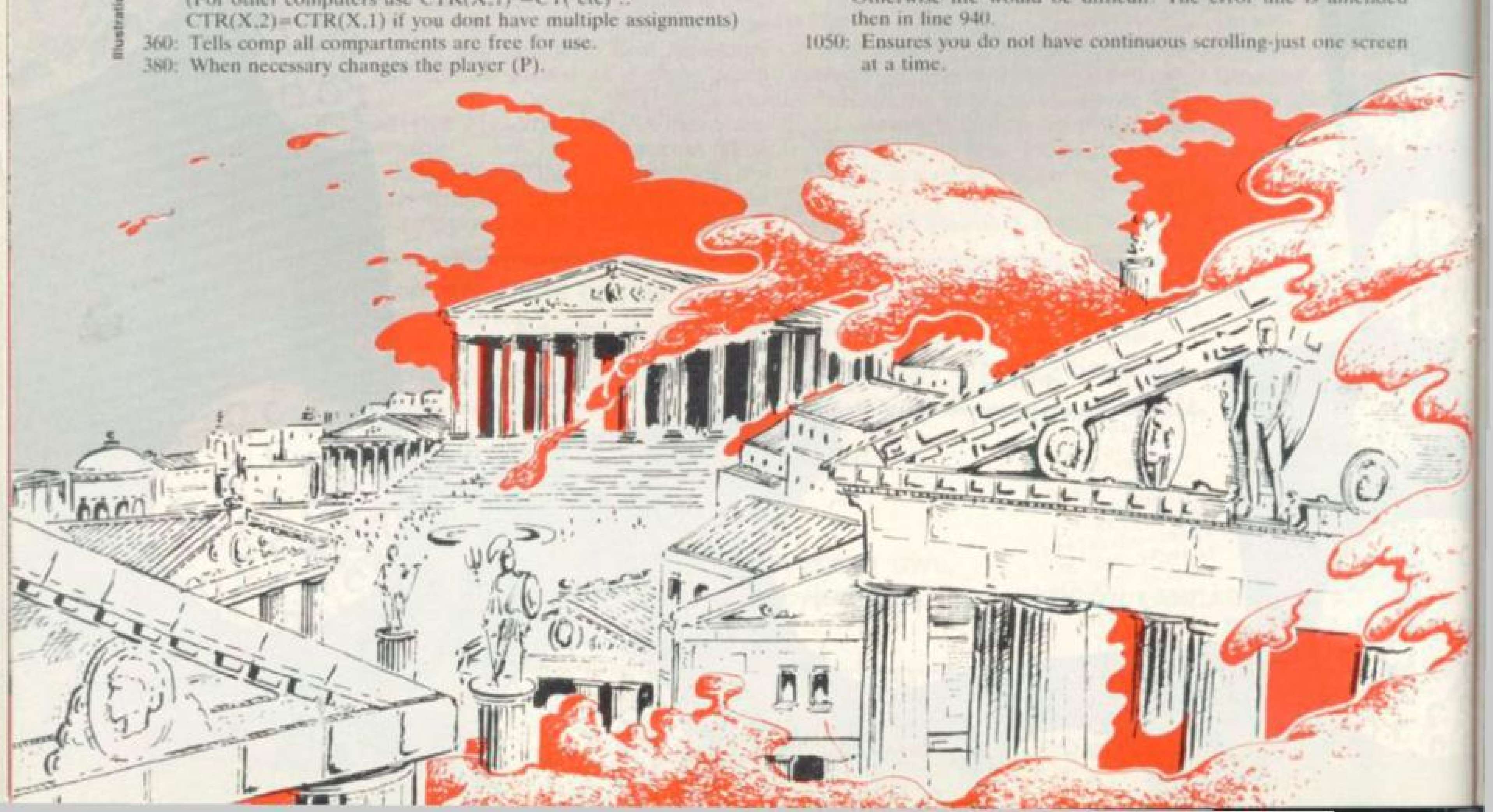
820-870: Final scoring & evaluation

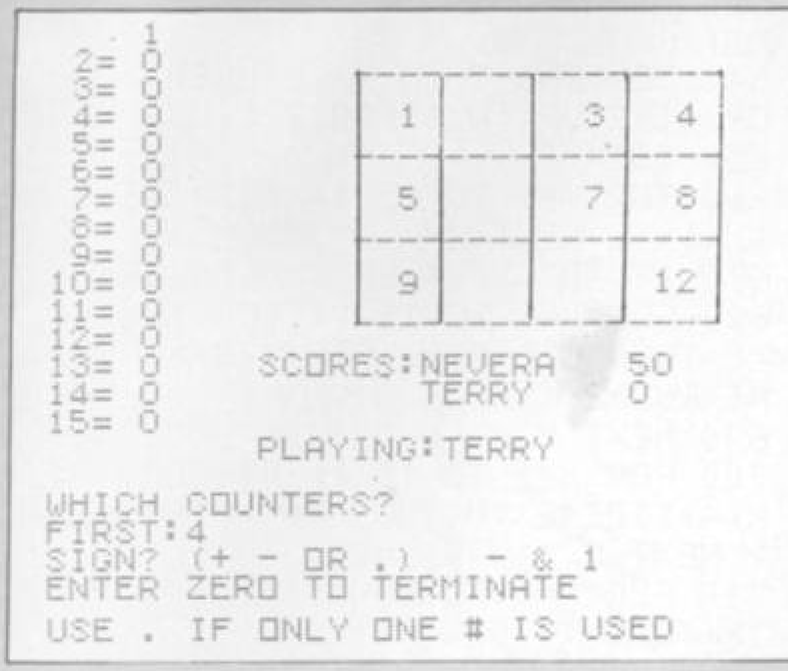
880: Run again — if you do not have RUN as a command then reset scores as shown and use GOTO 1080.

970: If thermal printer has been selected but is not connected or switched on, this line will send you to 1030 for a message and then you will go back to the initial selection of line 920. Otherwise life would be difficult! The error line is amended then in line 940.

1050: Ensures you do not have continuous scrolling-just one screen at a time.

Illustration: Dorian Cross



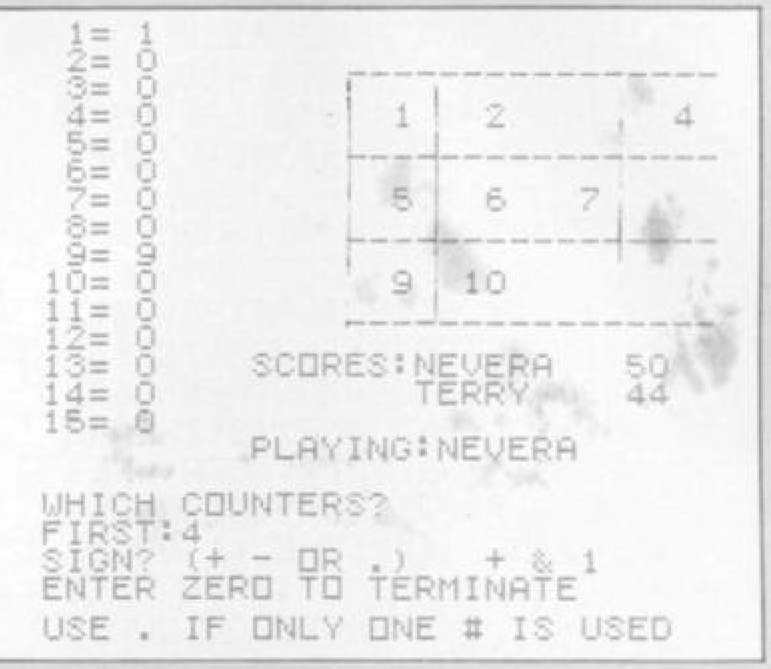


```
     1
  2= 0
  3= 0
  4= 0
  5= 0
  6= 0
  7= 0
  8= 0
  9= 0
 10= 0
 11= 0
 12= 0
 13= 0
 14= 0
 15= 0

         SCORES:NEVERA    50
                TERRY     0

         PLAYING:TERRY

WHICH COUNTERS?
FIRST:4
SIGN? (+ - OR .)    - & 1
ENTER ZERO TO TERMINATE
USE . IF ONLY ONE # IS USED
```



```
  1= 1
  2= 0
  3= 0
  4= 0
  5= 0
  6= 0
  7= 0
  8= 0
  9= 9
 10= 0
 11= 0
 12= 0
 13= 0
 14= 0
 15= 0

         SCORES:NEVERA    50
                TERRY     44

         PLAYING:NEVERA

WHICH COUNTERS?
FIRST:4
SIGN? (+ - OR .)    + & 1
ENTER ZERO TO TERMINATE
USE . IF ONLY ONE # IS USED
```

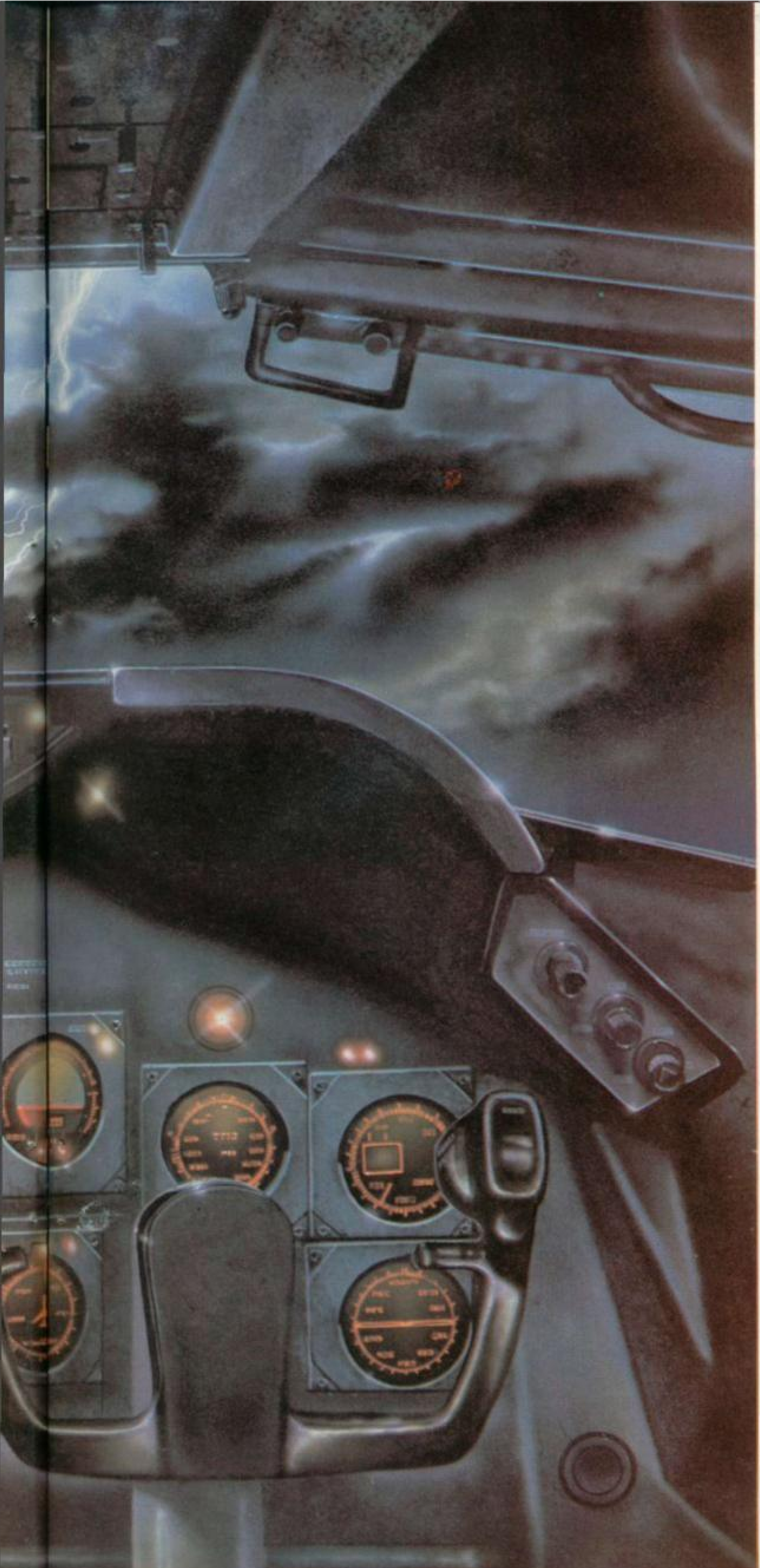
```
100 REM
110 REM POMPEII - FOR 99/4
IN EXTENDED BASIC          BY S
TEPHEN SHAW © 1982
120 ON ERROR 130
130 CALL CHAR(104,"FF80BE8888B88
0FF017D417D057D01FF")!SJS LOGO
140 ON WARNING NEXT :: ON BREAK
NEXT
150 CALL CLEAR :: RANDOMIZE :: D
IM CT(15,2),CTR(15,2),BX(12),RR(
12),CC(12)
160 DISPLAY AT(2,10):"POMPEII" :
: P=1
170.DISPLAY AT(4,1):"FOR 99/4 BY
 STEPHEN SHAW"
180 CALL CHAR(100,RPT$("0",14)&"
FF"&RPT$("01",8)&RPT$("01",7)&"F
F")
190 CALL HCHAR(6,15,104):: CALL
HCHAR(7,15,105)
200 DISPLAY AT(18,1):"WOULD YOU
LIKE INSTRUCTIONS?" :: DISPLAY A
T(19,10):"Y/N"
210 ACCEPT AT(19,15)BEEP SIZE(1)
VALIDATE("YN"):A$
220 IF A$="Y" THEN 900 ELSE 1080
230 REM SET UP / PLAY FM 240
CONT FROM 340
240 CALL CLEAR :: FOR R=2 TO 11
STEP 3 :: CALL HCHAR(R,16,100,16
):: NEXT R
250 FOR V=15 TO 31 STEP 4 :: CAL
L VCHAR(3,V,101,9):: NEXT V
260 CALL HCHAR(1,12,104):: CALL
HCHAR(2,12,105)! LOGO
270 FOR R=5 TO 11 STEP 3 :: FOR
V=19 TO 31 STEP 4 :: CALL HCHAR(
R,V,102):: NEXT V :: NEXT R
280 FOR R=1 TO 4 :: CC(R)=13+4*R
 :: RR(R)=4 :: CALL HCHAR(4,CC(R
)+1,R+48)
290 CC(R+4)=13+4*R :: RR(R+4)=7
:: CALL HCHAR(7,CC(R+4)+1,R+52)
300 CC(R+8)=13+4*R :: RR(R+8)=10
 :: NEXT R :: CALL HCHAR(10,18,5
7):: CALL HCHAR(10,21,49):: CALL
 HCHAR(10,22,48)
310 DISPLAY AT(10,23)SIZE(2):"11
" :: DISPLAY AT(10,27)SIZE(2):"1
2" ! BOARD DRAWN & NUMBERED
320 FOR X=1 TO 15 :: DISPLAY AT(
X,1)SIZE(3):USING "##=":X :: NEX
T X
330 DISPLAY AT(13,10):"SCORES:"&
P$(1):: DISPLAY AT(14,17):P$(2):
: DISPLAY AT(13,26):STR$(SCORE(1
)):: DISPLAY AT(14,26):STR$(SCOR
E(2))
340 DISPLAY AT(16,10):"PLAYING:"
350 FOR X=1 TO 15 :: CT(X,1)=X :
: CT(X,2)=0 :: CTR(X,1),CTR(X,2)
=CT(X,INT(RND*2+1)):: DISPLAY AT
(X,4)SIZE(2):USING "##":CTR(X,1)
:: NEXT X
360 FOR X=1 TO 12 :: BX(X)=X ::
NEXT X
370 DISPLAY AT(21,1):"ENTER ZERO
 TO TERMINATE"
380 IF TOT=0 THEN 390 :: CALL SO
UND(660,660,0):: P=P+1 :: IF P=3
 THEN P=1 ! CONTINUE PLAY FROM H
ERE
390 DISPLAY AT(16,18)SIZE(10):P$
(P)
400 DISPLAY AT(24,1):"USE . IF O
NLY ONE # IS USED"
410 DISPLAY AT(18,1):"WHICH COUN
TERS? " :: DISPLAY AT(19,1)SIZE
(32):"FIRST:"
420 ACCEPT AT(19,7)BEEP VALIDATE
(DIGIT)SIZE(2):ONE :: IF ONE=0 T
HEN 640
425 IF ONE>15 THEN GOSUB 1130 ::
 GOTO 410
430 IF CTR(ONE,1)<>ONE THEN DISP
```

```
LAY AT(19,1):"NOT AVAILABLE
" :: GOSUB 1130 :: GOTO 410
440 CTR(ONE,1)=0 :: DISPLAY AT(O
NE,4)SIZE(2):USING "##":CTR(ONE,
1)
450 DISPLAY AT(20,1):"SIGN? (+ -
 OR .)"
460 SG$="!" :: ACCEPT AT(20,20)B
EEP SIZE(1)VALIDATE("+-."):SG$ :
: IF SG$=" " OR SG$="" THEN 460
470 IF SG$="." AND ONE>12 THEN C
ALL HCHAR(20,1,32,32):: CTR(ONE,
1)=CTR(ONE,2):: DISPLAY AT(ONE,4
)SIZE(2):USING "##":ONE :: GOTO
410
480 IF SG$<>"." THEN 510
490 IF SG$="." AND BX(ONE)<>ONE
THEN DISPLAY AT(19,1):"NOT AVAIL
ABLE    " :: GOSUB 620 :: GOSUB 1
130 :: CALL HCHAR(20,1,32,32)::
GOTO 410
500 IF SG$="." AND BX(ONE)=ONE T
HEN BX(ONE)=0 :: CALL HCHAR(RR(O
NE),CC(ONE),32,2):: CALL HCHAR(2
0,1,32,32):: GOTO 410
510 IF SG$<>"+" AND SG$<>"-" THE
N 410 ! SG$ NOW= + OR -
520 DISPLAY AT(20,22):"&" :: ACC
EPT AT(20,24)SIZE(2)BEEP VALIDAT
E(DIGIT):TWO
530 IF TWO>15 OR CTR(TWO,1)<>TWO
 THEN DISPLAY AT(20,1):"NOT AVAI
LABLE  " :: GOSUB 1130 :: CALL H
CHAR(20,20,32,12):: GOTO 520
540 IF TWO=0 THEN CALL HCHAR(20,
1,32,32):: GOSUB 620 :: GOTO 410
550 CTR(TWO,1)=0 :: DISPLAY AT(T
WO,4)SIZE(2):USING "##":CTR(TWO,
1)
560 IF SG$="+" THEN X=ONE+TWO ::
 IF X>12 THEN DISPLAY AT(20,1):".
ONLY 12 BOXES!" :: GOSUB 620 ::
GOSUB 630 :: GOTO 410
570 IF SG$="-" THEN X=ABS(ONE-TW
O):: IF X>12 THEN GOSUB 620 :: G
OSUB 630 :: GOTO 410
580 IF BX(X)<>X THEN GOSUB 630 :
: GOSUB 620 :: DISPLAY AT(20,1):
"NOT POSSIBLE    " :: CALL HCHAR(
20,1,32,32):: GOTO 410
590 BX(X)=0 :: CALL HCHAR(RR(X),
CC(X),32,2):: CALL HCHAR(19,1,32
,64)
600 GOTO 410
610 STOP
620 CTR(ONE,1)=CTR(ONE,2):: DISP
LAY AT(ONE,4)SIZE(2):USING "##":
ONE :: RETURN
630 CTR(TWO,1)=CTR(TWO,2):: DISP
LAY AT(TWO,4)SIZE(2):USING "##":
TWO :: RETURN
640 REM END TURN (ALL USED
OR GIVE UP IN DESPAIR !
650 TOT=0
660 FOR X=1 TO 15 :: TOT=TOT+CTR
(X,1):: NEXT X
670 IF TOT<>0 THEN 750 !SCORE
680 FOR X=1 TO 15 :: IF CTR(X,2)
=0 THEN CTR(X,1),CTR(X,2)=CT(X,I
NT(RND*2+1))
690 NEXT X
700 FOR X=1 TO 15 :: DISPLAY AT(
X,4)SIZE(2):USING "##":CTR(X,1):
: NEXT X :: TEST=0
710 FOR X=1 TO 15 :: TEST=CTR(X,
1)+TEST :: NEXT X
720 IF TEST=0 THEN 750 ! PERFECT
 SCORE
730 GOTO 380 !CONTINUE SAME PLAY
ER
740 STOP
750 TBX=0 ! SCORE SECTION
760 FOR X=1 TO 12 :: TBX=TBX+BX(
X):: NEXT X
770 SCORE(P)=SCORE(P)+TOT+TBX
780 DISPLAY AT(12+P,26):USING "#
##":STR$(TOT+TBX):: TOT=-1
790 IF SCORE(1)>100 OR SCORE(2)>
100 THEN 800 ELSE 280
800 IF P=2 THEN 820 ELSE 280
810 STOP !****
820 CALL CLEAR :: IF SCORE(1)>SC
ORE(2)THEN P=1 ELSE P=2
830 PRINT
840 PRINT P$(P)&" SCORE "&STR$(S
CORE(P))&" LOSES": :
850 P=P+1 :: IF P=3 THEN P=1
855 PRINT P$(P)&" SCORE "&STR$(S
CORE(P))&" WINS": : : :
860 PRINT "ANOTHER GAME? Y OR N"
;:: INPUT A$ :: IF A$="Y" THEN 8
80 ELSE IF A$<>"N" THEN 860
870 STOP
880 SCORE(1),SCORE(2)=0 :: RUN 1
080
890 STOP
900 REM INSTRUCTIONS HERE
910 REM PRINTER/SCREEN
920 CALL CLEAR :: PRINT "POMPEII
": :"WOULD YOU LIKE THE (LONG)
 INSTRUCTIONS ON YOUR TV     SCR
EEN,OR ON YOUR THERMAL   PRINTER
?"
930 PRINT "ENTER TV OR TP";
940 ON ERROR 230 :: INPUT A$ ::
IF A$<>"TP" AND A$<>"TV" THEN 94
0
950 IF A$="TV" THEN 1040
960 REM A$="TP"-PRINTER-FIRST TE
ST!
```

Illustration: Dorian Cross

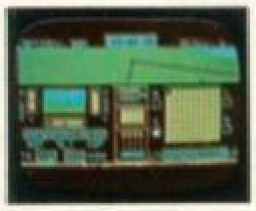
```
970 ON ERROR 1030
980 OPEN #1:"TP,U.S.E",OUTPUT ::
 FOR IN=1 TO 300 :: READ A$ :: I
F A$="END" THEN 1020
990 PRINT #1:A$ :: NEXT IN :: CA
LL CLEAR
1000 REM NO MORE
1010 REM
1020 CLOSE #1 :: CALL CLEAR :: O
N ERROR 230 :: GOTO 1080
1030 CALL SOUND(700,440,0) :: PRI
NT "CANNOT ACCESS PRINTER" :: FO
R IN=1 TO 900 :: NEXT IN :: RETU
RN 920
1040 CALL CLEAR :: FOR IN=1 TO 3
00 :: READ A$ :: IF A$="END" THE
N 1070
1050 IF IN/18=INT(IN/18)THEN PRI
NT "PRESS ENTER TO CONTINUE" ::
INPUT A$ :: CALL CLEAR
1060 PRINT A$ :: NEXT IN
1070 REM
1080 REM INPUT NAMES
1090 PRINT "PLAYERS NAMES:MAX 8
CHARS:"
1100 INPUT "PLAYER ONE:":P$(1)::
 IF LEN(P$(1))>8 THEN 1100
1110 INPUT "PLAYER TWO:":P$(2)::
 IF LEN(P$(2))>8 THEN 1110
1115 IF P=0 THEN P=1
1120 GOTO 230
1130 FOR COUNT=1 TO 700 :: NEXT
COUNT :: RETURN
1140 END
1150 DATA POMPEII,BY STEPHEN SHA
W,FOR TEXAS INSTRUMENTS 99/4,AND
 99/4A,IN EXTENDED BASIC
1160 DATA ,THIS GAME IS BASED ON
 GAMING,CHIPS FOUND AT POMPEII,&
 IS COPYRIGHT BY,WHITTLECRAFT,
1170 DATA RULES FROM GAMES & PUZ
ZLES,OCTOBER 1977,,,,,,,,
1180 DATA THE BASIC GAME IS AS F
OLLOWS,THERE IS A BOX WITH TWELV
E,COMPARTMENTS,AND FIFTEEN DOUBL
E SIDED,COUNTERS,WITH ONE SIDE B
LANK AND
1190 DATA THE OTHER WITH A NUMBE
R,,THE FIRST PLAYER THROWS THE,1
5 COUNTERS AND MUST USE THE,NUMB
ERS ON THOSE THAT FALL
1200 DATA NUMBER UP IN ACCORDANC
E WITH,THE FOLLOWING RULES,,,,,
1210 DATA THE VALUE OF ONE COUNT
ER MAY,BE USED TO 'FILL' ONE,COM
PARTMENT,OR THE SUM OR DIFFERENC
E OF,TWO COUNTERS MAY BE USED,
1220 DATA WHEN(IF) ALL FACEUP CO
UNTERS,ARE USED UP,THOSE WHICH I
NITIALLY FELL,BLANK UP ARE RETHR
OWN,AND PLAYER ONE CONTINUES
1230 DATA UNTIL HE CANNOT USE A
COUNTER OR NO COUNTER,FALLS FACE
 UP,,,,
1240 DATA WHEN THE FIRST PLAYER
CANNOT,CONTINUE,THE TOTAL VALUE
OF ALL FACE-,UP COUNTERS AND ALL
 UNFILLED,COMPARTMENTS IS ADDED
TO HIS,
1250 DATA SCORE (A LOW SCORE WIN
S),PLAY TERMINATE, IN THIS,VERS
ION WHEN AFTER THE,SECOND PLAYER
 FINISHES A ROUND ONE PLAYER SCO
RES
1260 DATA OVER 100,,,
1270 DATA IN COMPUTER PLAY THE,C
OUNTERS WILL APPEAR ON THE,LEFT
SIDE OF THE SCREEN,THE COMPARTME
NTS ON THE   . RIGHT
1280 DATA THE PLAYER PLAYING IS,
INDICATED,AND BOTH SCORES.,AT TH
E END OF A PLAYERS TURN,THE SCOR
E FOR THAT TURN IS,FIRST SHOWN
1290 DATA THEN THE TOTAL.,ENTRIE
S MADE WHICH ARE NOT,POSSIBLE WI
LL BE IGNORED,THERE IS NO PENALT
Y.,,,
1300 DATA ENTER THE NUMBER OF TH
E,FIRST COUNTER,THEN  IF ONLY ON
E IS TO BE,USED A '.'-FULL STOP,
IF ANOTHER COUNTER IS TO BE
1310 DATA USED THEN ENTER A + OR
 -,FINALLY ENTER THE VALUE OF,TH
E SECOND COUNTER,,
1320 DATA EG THREE SEPARATE ENTR
IES-,WATCH FOR INPUT PROMPTS,,,,
,,,,
1330 DATA TO THROW AGAIN WHEN YO
U HAVE,USED ALL THE COUNTERS SHO
WN,OR IF YOU CANNOT USE THEM,ALL
  ENTER A 0 (ZERO)
1340 DATA WATCH FOR 'PLAYING',IN
DICATOR AS THE COMPUTER,WILL AUT
OMATICALLY CHANGE,PLAYERS IF ALL
 BLANKS ARE,THROWN,,,,GOOD LUCK
1350 DATA " ",,,,,,,,,POMPEII,,FO
R TI99/4 BY STEPHEN SHAW,1982,IN
 EXTENDED BASIC,,,END,END,END,EN
D
1360 END
```

"We will be flying at a height of 30,000 feet.
Our air speed will be 500 knots.
And there's a fair chance we're going to crash."
11420



No smoking. Fasten your seat belt. You're about to take off in a 747. But on this flight you're the pilot.

You could hardly describe THORN EMI's 'Jumbo Jet Pilot' as simply another video game. It's more like a session in a flight simulator with life-like instrumentation and graphics.



Jumbo Jet Pilot. 16 K ROM Cartridge. 5 skill levels. Performance rating. Controls: Throttle. Ailerons. Elevators. Undercarriage. Brakes. Stall Indicator. Lights. Fuel. Longitude. Latitude. Air Speed. Artificial Horizon. Altitude. Pitch and Roll. Heading. Vertical Speed. Map Reference and Grid. Time Elapsed.

To cope you need to be alert. You should expect the unexpected. And you definitely shouldn't lower the undercarriage when your air speed is dropping and the horizon suddenly appears vertical!

On landing, your in-flight computer will assess your skills and give a 'performance rating'. If you manage to land that is.

'Jumbo Jet Pilot' is one of 21 challenging new home computer games from THORN EMI. It's pretty demanding. But our programs aren't all work and no play.

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And whilst budding Beethovens play the 'VIC Music Composer,' would-be Chancellors can work on their budgets with 'Home Financial Management'.

Darts

Humpty Dumpty

We also have educational puzzles for children that will puzzle adults at higher skill levels. But there's one simple idea behind all our titles: we've designed them for players who are bored with run-of-the-mill TV games.

Now, is that Heathrow ahead? Or is it Hyde Park?

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HOME FINANCIAL MANAGEMENT
VIC MUSIC COMPOSER
SOCCER
FIGURE FUN
CWARI & BULL AND COW
HUMPTY DUMPTY & JACK AND JILL
EUROPEAN SCENE

PROGRAMS FOR ATARI 400/800 (Trademark of Atari Inc. except where indicated).
*PROGRAMS FOR COMMODORE VIC 20 (Trademark of Commodore International).

Available from all branches of Laskys (Nationwide), Micro C at Currys, and all other leading Computer software outlets.

Escape from the Pyramids of Mars

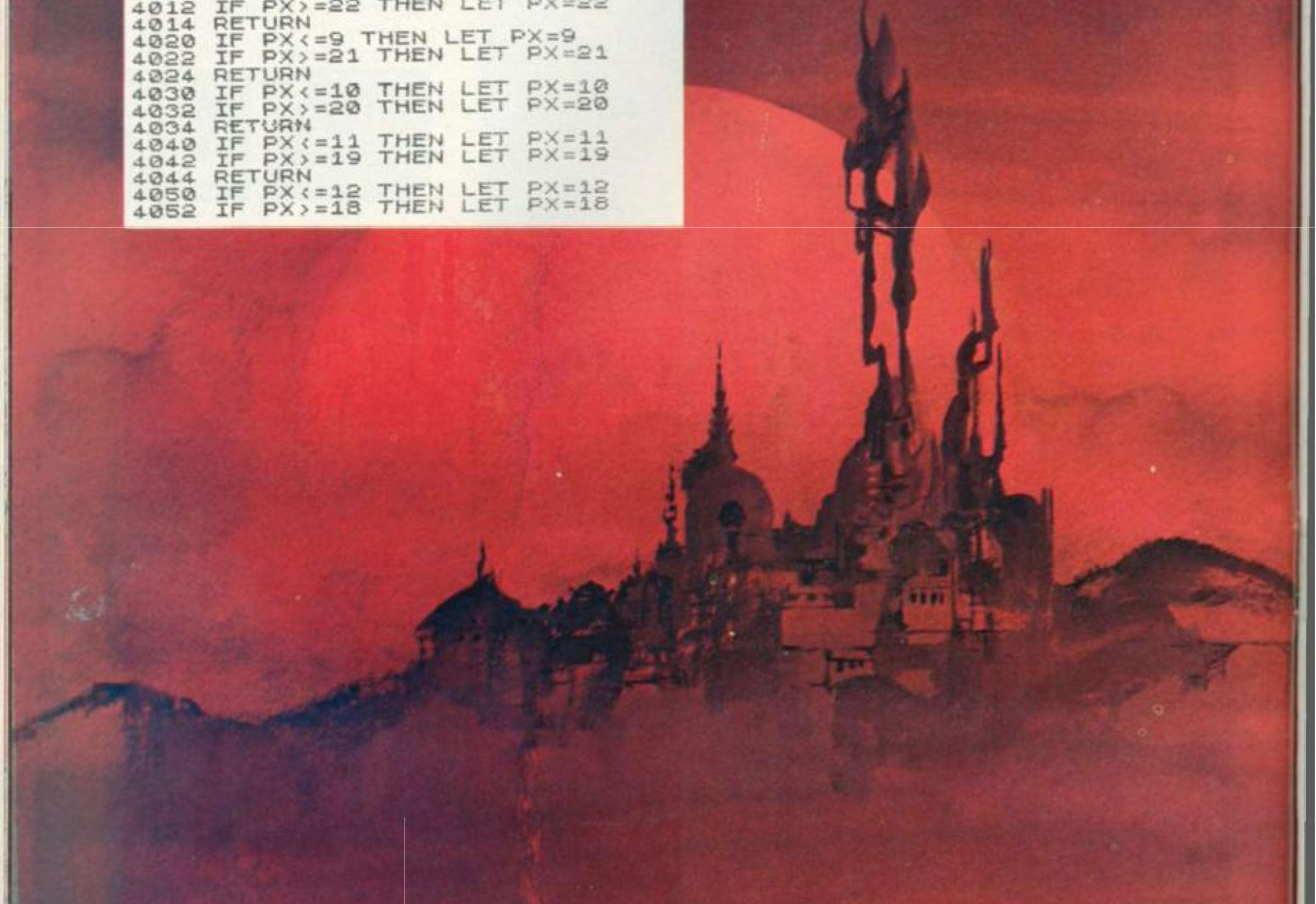
Mars hides many secrets beneath its silent shifting sands. Was there a highly intelligent ancient race which existed on the planet in times long past?

You are a member of a team attempting to solve that mystery. You were on the verge of a great breakthrough after a mysterious pyramid was uncovered by excavations in one of the many Martian deserts — miles from the nearest earth colony. Your mission was to explore this newly unearthed structure.

But on entering you found yourself trapped in the interior of the pyramid. To escape you discovered that you needed four keys from the tomb's inner chamber. But you can only carry one key at a time due to a strange force which surrounds them.

The corridors and key chamber are protected by defence mechanisms still operational after millions of years. And your air supply is running out . . .

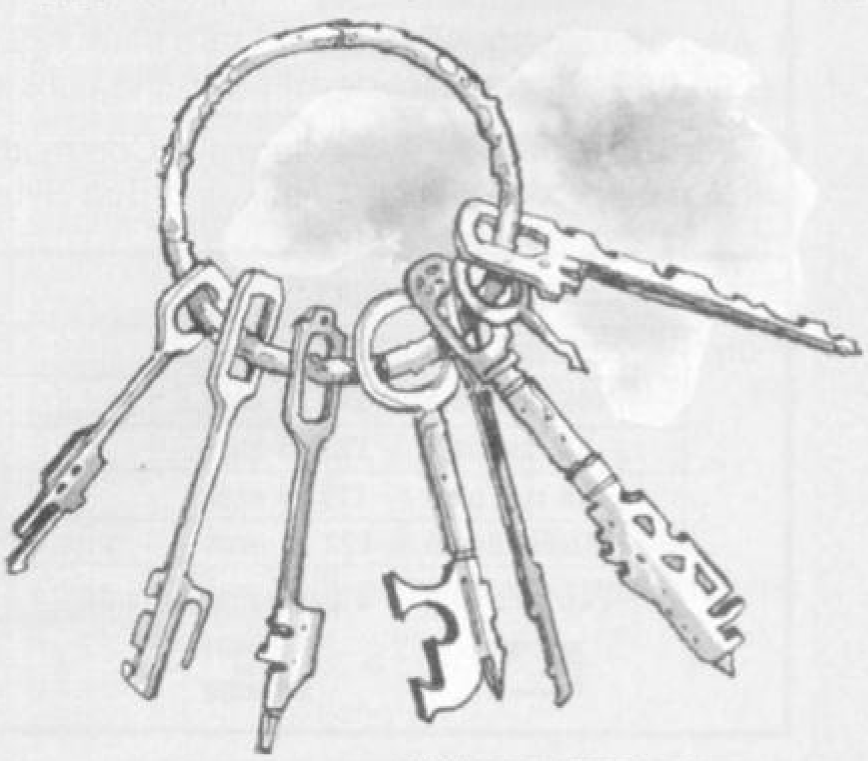
```
 190 LET F=0
 200 GOSUB 9050
 220 LET H$="MINUTES"
 225 RAND
 230 LET PY=3
 240 LET PX=15
 250 LET A=1
 260 LET P$=" O "
 268 LET Q=1
 270 LET D=0
 280 LET K=0
 290 LET A1=1
 300 LET A2=1
 310 LET A3=1
 320 LET A4=1
 325 LET T=240
 327 IF F=1 THEN GOTO 6670
3000 PRINT AT PY-1,PX;"   "
3010 PRINT AT PY+1,PX+Q;"  "
3020 PRINT AT PY,PX;P$
3025 GOSUB (INT (RND*10)*10)+600
0
3027 LET T=T-1
3028 IF T=0 THEN GOTO 6595
3030 LET PY1=PY
3035 LET PX1=PX
3040 IF INKEY$="5" THEN LET PX=P
X-1
3050 IF INKEY$="6" THEN LET PY=P
Y+1
3060 IF INKEY$="7" THEN LET PY=P
Y-1
3070 IF INKEY$="8" THEN LET PX=P
X+1
3075 LET G=3980+10*PY
3080 GOSUB G
3085 GOTO 3000
4000 IF PX<>15 THEN LET PY=3
4002 IF PY<2 THEN LET PY=2
4004 IF PX=15 AND K=1 THEN GOTO
4700
4006 RETURN
4011 IF PX<=8 THEN LET PX=8
4012 IF PX>=22 THEN LET PX=22
4014 RETURN
4020 IF PX<=9 THEN LET PX=9
4022 IF PX>=21 THEN LET PX=21
4024 RETURN
4030 IF PX<=10 THEN LET PX=10
4032 IF PX>=20 THEN LET PX=20
4034 RETURN
4040 IF PX<=11 THEN LET PX=11
4042 IF PX>=19 THEN LET PX=19
4044 RETURN
4050 IF PX<=12 THEN LET PX=12
4052 IF PX>=18 THEN LET PX=18
```



RUNS ON A ZX81 IN 16K

BY DAVID HEALEY

```
4054 RETURN
4060 IF PX<=13 THEN LET PX=13
4062 IF PX>=17 THEN LET PX=17
4064 RETURN
4070 IF PX<=14 THEN LET PX=14
4072 IF PX>=16 THEN LET PX=16
4074 RETURN
4080 IF PX<>15 THEN LET PX=15
4082 RETURN
4090 GOTO 4080
4100 GOTO 4060
4110 GOTO 4080
4115 GOTO 4080
4120 GOTO 4080
4130 GOTO 4080
4150 IF PY=17 AND PX<>15 THEN LE
T PY=PY1
4151 IF PY=17 AND PX<>15 THEN LE
T PX=PX1
4180 IF PY>18 THEN LET PY=18
4181 IF PY<18 AND PX<>15 THEN LE
T PY=18
4182 IF PX<2 THEN LET PX=2
4183 IF PX>28 THEN LET PX=28
4184 IF PX=9 AND A1=1 AND K=0 TH
EN GOTO 4500
4185 IF PX=21 AND A2=1 AND K=0 T
HEN GOTO 4510
4186 IF PX=26 AND A3=1 AND K=0 T
HEN GOTO 4520
4188 IF PX=4 AND A4=1 AND K=0 TH
EN GOTO 4530
4189 IF INKEY$="5" OR INKEY$="7"
 AND PX<>15 THEN RETURN
4200 RETURN
4500 LET A1=0
4505 GOTO 4600
4510 LET A2=0
4515 GOTO 4600
4520 LET A3=0
4525 GOTO 4600
4530 LET A4=0
4535 GOTO 4600
4600 LET K=1
4610 LET P$=" ▓ "
4620 RETURN
4700 LET D=D+1
4710 PRINT AT 0,16;D
4720 LET P$=" O "
4730 IF D=4 THEN GOTO 7000
4735 LET K=0
4740 RETURN
6000 PRINT AT 11,13;"▓ ";AT 11,1
3;"▓▒"
6002 IF PY=11 THEN GOTO 6500
6003 RETURN
6010 PRINT AT 11,18;" ▓";AT 11,1
8;"▒▓"
6012 IF PY=11 THEN GOTO 6500
6013 RETURN
6020 PRINT AT 13,13;"▓ ";AT 13,1
3;"▓▒"
6022 IF PY=13 THEN GOTO 6500
6023 RETURN
6030 PRINT AT 13,18;" ▓";AT 13,1
8;"▒▓"
6032 IF PY=13 THEN GOTO 6500
6033 RETURN
6040 PRINT AT 15,13;"▓ ";AT 15,1
3;"▓▒"
6042 IF PY=15 THEN GOTO 6500
6043 RETURN
6050 PRINT AT 15,18;" ▓";AT 15,1
8;"▒▓"
6052 IF PY=15 THEN GOTO 6500
6053 RETURN
6060 PRINT AT 15,5;"▓";AT 16,5;"
 ";AT 15,5;"█";AT 16,5;"▒"
6062 IF PX=4 THEN GOTO 6500
6063 RETURN
6070 PRINT AT 15,10;"▓";AT 16,10
;" ";AT 15,10;"█";AT 16,10;"▒"
6072 IF PX=9 THEN GOTO 6500
6073 RETURN
6080 PRINT AT 15,22;"▓";AT 16,22
;" ";AT 15,22;"█";AT 16,22;"▒"
6082 IF PX=21 THEN GOTO 6500
6083 RETURN
6090 PRINT AT 15,27;"▓";AT 16,27
;" ";AT 15,27;"█";AT 16,27;"▒"
6092 IF PX=26 THEN GOTO 6500
6093 RETURN
6500 FOR L=1 TO 30
6505 PRINT AT PY,PX;" +";AT PY,P
X;" ▓";AT PY,PX;" ,"
6508 NEXT L
6510 FOR L=1 TO 50
6520 NEXT L
6525 CLS
6530 PRINT "YOU HAVE BEEN ANNIHI
LATED BY THE"
6540 PRINT "PYRAMIDS SELF DEFENC
E MECHANISM"
6550 PRINT "GOOD JOB ITS ONLY A
GAME"
6560 PRINT
6570 PRINT "PRESS N/L FOR ANOTHE
R GAME"
6575 IF INKEY$="" THEN GOTO 6575
6577 LET F=1
6578 CLS
6580 GOTO 220
6585 LET F=0
6590 GOTO 9765
6595 CLS
6600 PRINT "YOU HAVE SUFFOCATED
THROUGH "
6610 PRINT "LACK OF OXYGEN. HARD
 LUCK."
6620 PRINT
6630 PRINT "PRESS N/L FOR ANOTHE
R GAME."
6640 IF INKEY$="" THEN GOTO 6640
6642 LET F=1
6644 CLS
6650 GOTO 220
6660 LET F=0
6670 GOTO 9765
7000 CLS
7005 PRINT AT 6,16;"█"
7010 PRINT AT 7,15;"███"
7020 PRINT AT 8,14;"█████"
7030 PRINT AT 9,13;"███████"
7040 PRINT AT 10,12;"█████████"
7050 PRINT AT 11,11;"██████████
█"
7060 PRINT AT 12,10;"██████████
███"
7070 PRINT AT 13,9;"███████████
████"
7080 PRINT AT 14,8;"███████████
██████"
7090 PRINT AT 15,7;"███████████
████████"
7100 PRINT AT 16,6;"███████████
██████████"
7110 PRINT AT 17,5;"███████████
████████████"
7120 PRINT AT 18,4;"███████████
██████████████"
7130 PRINT AT 19,3;"███████████
████████████████"
7140 PRINT AT 20,2;"███████████
██████████████████"
7150 FOR L=1 TO 10
7160 NEXT L
7300 PRINT AT 20,15;"▀▀▀▀▀▀▀▀▜"
```



Illustrations: Jon Davis

ATOM

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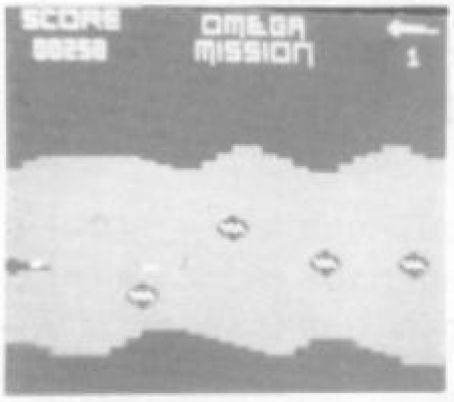
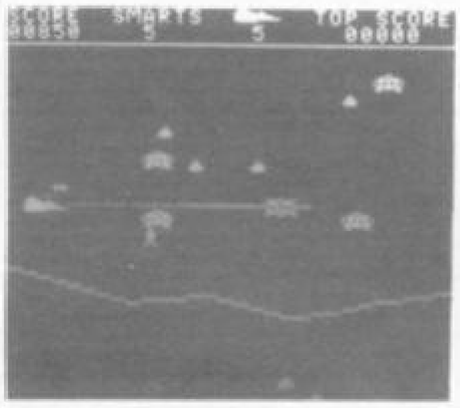


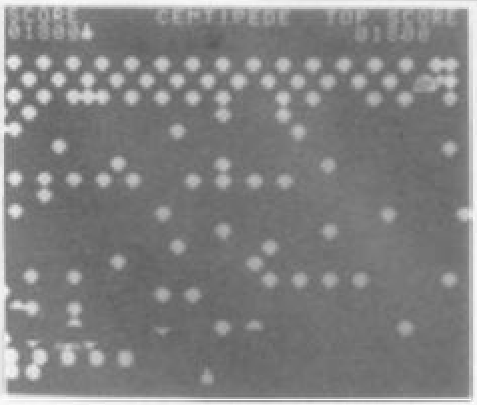
OMEGA MISSION £7

The first and only version of the superb Scramble Arcade game. Moving landscape! Fly over mountains, through caves and tunnels. 5 different stages: Ground to Air Missiles, Fire Balls, Space Craft, Mutants and the narrow twisting Tunnel. Movement in 8 directions, laser cannon. Excellent COLOUR graphics (give Black & White on monochrome T.V.) mode 3a, Sound Effects. Top score.

THE PROTECTOR £7

The most realistic version of this amazing Arcade game available for the Atom. Defend your humanoids from mutation and destroy the Aliens in this hyper fast, action packed game. Moving planetary surface, repeating lasers and smart bombs, thrust, super, increasing Attack Waves, 6 types of Aliens. Sound Effects. Top score and excellent mode 4 graphics are some of the features in this exciting game.



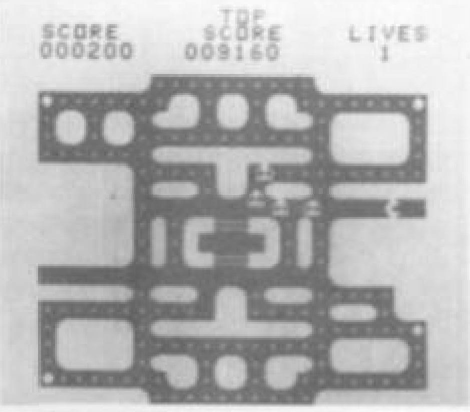


CENTIPEDE £6

The first and only version of this popular Arcade game for the Atom. Shoot down the splitting centipede as it twists through the mushroom field. Also inhabiting the game are Spiders, Bugs and Snails. The action increases until only skill and quick thinking can save you. Excellent high speed mode 4 graphics. Sound Effects and Top score.

PUCKMAN £5

One of the best versions of this popular Arcade maze chaser game. Eat all the dots in the maze but watch out for the hungry ghosts! Eat an Energy Blob and the chase reverses. Each maze cleared brings a new one with faster ghosts. Excellent high speed mode 4 graphics. Sound Effects and Top score.



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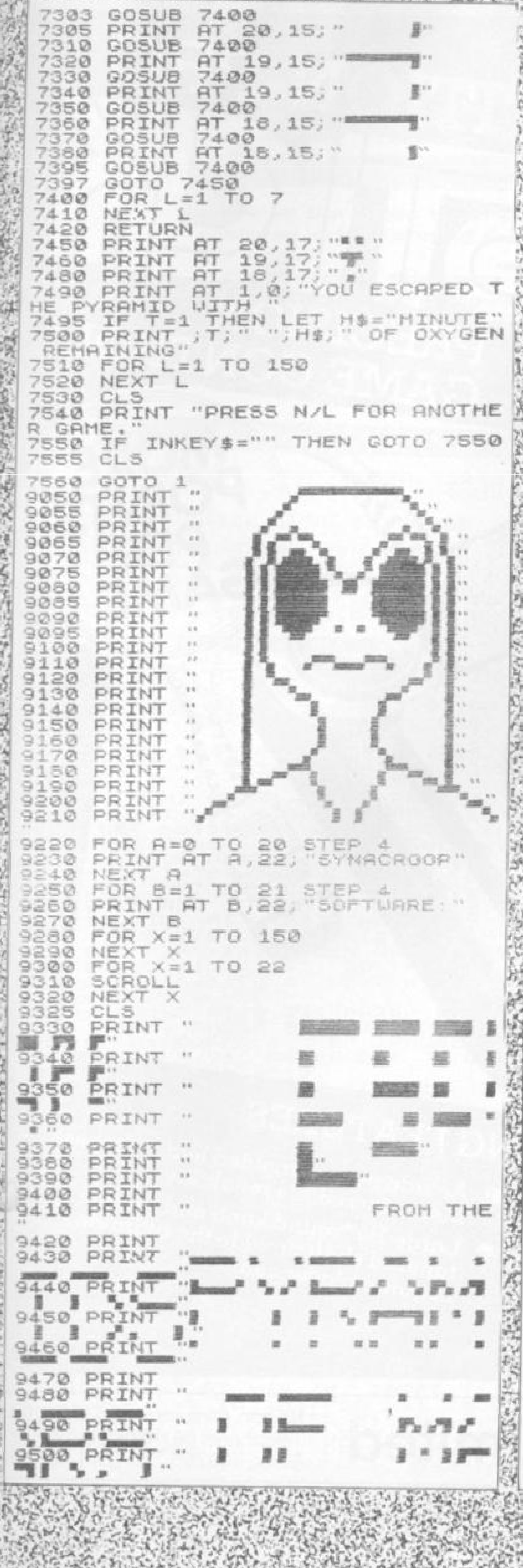
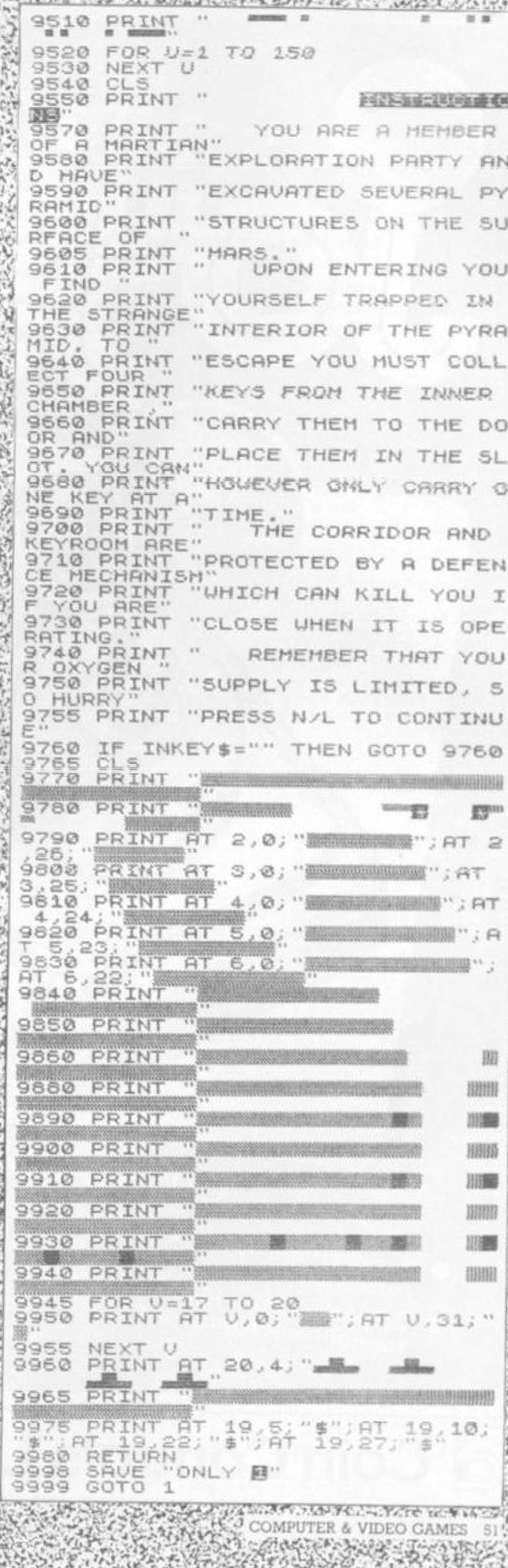


```
7303 GOSUB 7400
7305 PRINT AT 20,15;"     ▌"
7310 GOSUB 7400
7320 PRINT AT 19,15;"▀▀▀▀▀▀▜"
7330 GOSUB 7400
7340 PRINT AT 19,15;"     ▌"
7350 GOSUB 7400
7360 PRINT AT 18,15;"▀▀▀▀▀▀▜"
7370 GOSUB 7400
7380 PRINT AT 18,15;"     ▌"
7395 GOSUB 7400
7397 GOTO 7450
7400 FOR L=1 TO 7
7410 NEXT L
7420 RETURN
7450 PRINT AT 20,17;"▀▀"
7460 PRINT AT 19,17;"▀▜▀"
7480 PRINT AT 18,17;"▖"
7490 PRINT AT 1,0;"YOU ESCAPED T
HE PYRAMID WITH "
7495 IF T=1 THEN LET H$="MINUTE"
7500 PRINT ;T;" ";H$;" OF OXYGEN
 REMAINING"
7510 FOR L=1 TO 150
7520 NEXT L
7530 CLS
7540 PRINT "PRESS N/L FOR ANOTHE
R GAME."
7550 IF INKEY$="" THEN GOTO 7550
7555 CLS
7560 GOTO 1
9050 PRINT "
9055 PRINT "
9060 PRINT "
9065 PRINT "
9070 PRINT "
9075 PRINT "
9080 PRINT "
9085 PRINT "
9090 PRINT "
9095 PRINT "
9100 PRINT "
9110 PRINT "
9120 PRINT "
9130 PRINT "
9140 PRINT "
9150 PRINT "
9160 PRINT "
9170 PRINT "
9180 PRINT "
9190 PRINT "
9200 PRINT "
9210 PRINT "
"
9220 FOR A=0 TO 20 STEP 4
9230 PRINT AT A,22;"SYNACROOP"
9240 NEXT A
9250 FOR B=1 TO 21 STEP 4
9260 PRINT AT B,22;"SOFTWARE:"
9270 NEXT B
9280 FOR X=1 TO 150
9290 NEXT X
9300 FOR X=1 TO 22
9310 SCROLL
9320 NEXT X
9325 CLS
9330 PRINT "
9340 PRINT "
9350 PRINT "
9360 PRINT "
9370 PRINT "
9380 PRINT "
9390 PRINT "
9400 PRINT
9410 PRINT "                 FROM THE
"
9420 PRINT
9430 PRINT "
9440 PRINT "
9450 PRINT "
9460 PRINT "
9470 PRINT
9480 PRINT "
9490 PRINT "
9500 PRINT "
```



```
9510 PRINT "
9520 FOR V=1 TO 150
9530 NEXT V
9540 CLS
9550 PRINT "              INSTRUCTIO
NS"
9570 PRINT "   YOU ARE A MEMBER
OF A MARTIAN"
9580 PRINT "EXPLORATION PARTY AN
D HAVE"
9590 PRINT "EXCAVATED SEVERAL PY
RAMID"
9600 PRINT "STRUCTURES ON THE SU
RFACE OF "
9605 PRINT "MARS."
9610 PRINT "   UPON ENTERING YOU
 FIND "
9620 PRINT "YOURSELF TRAPPED IN
THE STRANGE"
9630 PRINT "INTERIOR OF THE PYRA
MID. TO "
9640 PRINT "ESCAPE YOU MUST COLL
ECT FOUR "
9650 PRINT "KEYS FROM THE INNER
CHAMBER ,"
9660 PRINT "CARRY THEM TO THE DO
OR AND"
9670 PRINT "PLACE THEM IN THE SL
OT. YOU CAN"
9680 PRINT "HOWEVER ONLY CARRY O
NE KEY AT A"
9690 PRINT "TIME."
9700 PRINT "   THE CORRIDOR AND
KEYROOM ARE"
9710 PRINT "PROTECTED BY A DEFEN
CE MECHANISM"
9720 PRINT "WHICH CAN KILL YOU I
F YOU ARE"
9730 PRINT "CLOSE WHEN IT IS OPE
RATING."
9740 PRINT "   REMEMBER THAT YOU
R OXYGEN "
9750 PRINT "SUPPLY IS LIMITED, S
O HURRY"
9755 PRINT "PRESS N/L TO CONTINU
E"
9760 IF INKEY$="" THEN GOTO 9760
9765 CLS
9770 PRINT "
9780 PRINT "
9790 PRINT AT 2,0;"";AT 2
,26;""
9800 PRINT AT 3,0;"";AT
3,25;""
9810 PRINT AT 4,0;"";AT
 4,24;""
9820 PRINT AT 5,0;"";A
T 5,23;""
9830 PRINT AT 6,0;"";
AT 6,22;""
9840 PRINT "
9850 PRINT "
9860 PRINT "
9880 PRINT "
9890 PRINT "
9900 PRINT "
9910 PRINT "
9920 PRINT "
9930 PRINT "
9940 PRINT "
9945 FOR V=17 TO 20
9950 PRINT AT V,0;"";AT V,31;"
"
9955 NEXT V
9960 PRINT AT 20,4;"
9965 PRINT "
9975 PRINT AT 19,5;"$";AT 19,10;
"$";AT 19,22;"$";AT 19,27;"$"
9980 RETURN
9998 SAVE "ONLY "
9999 GOTO 1
```

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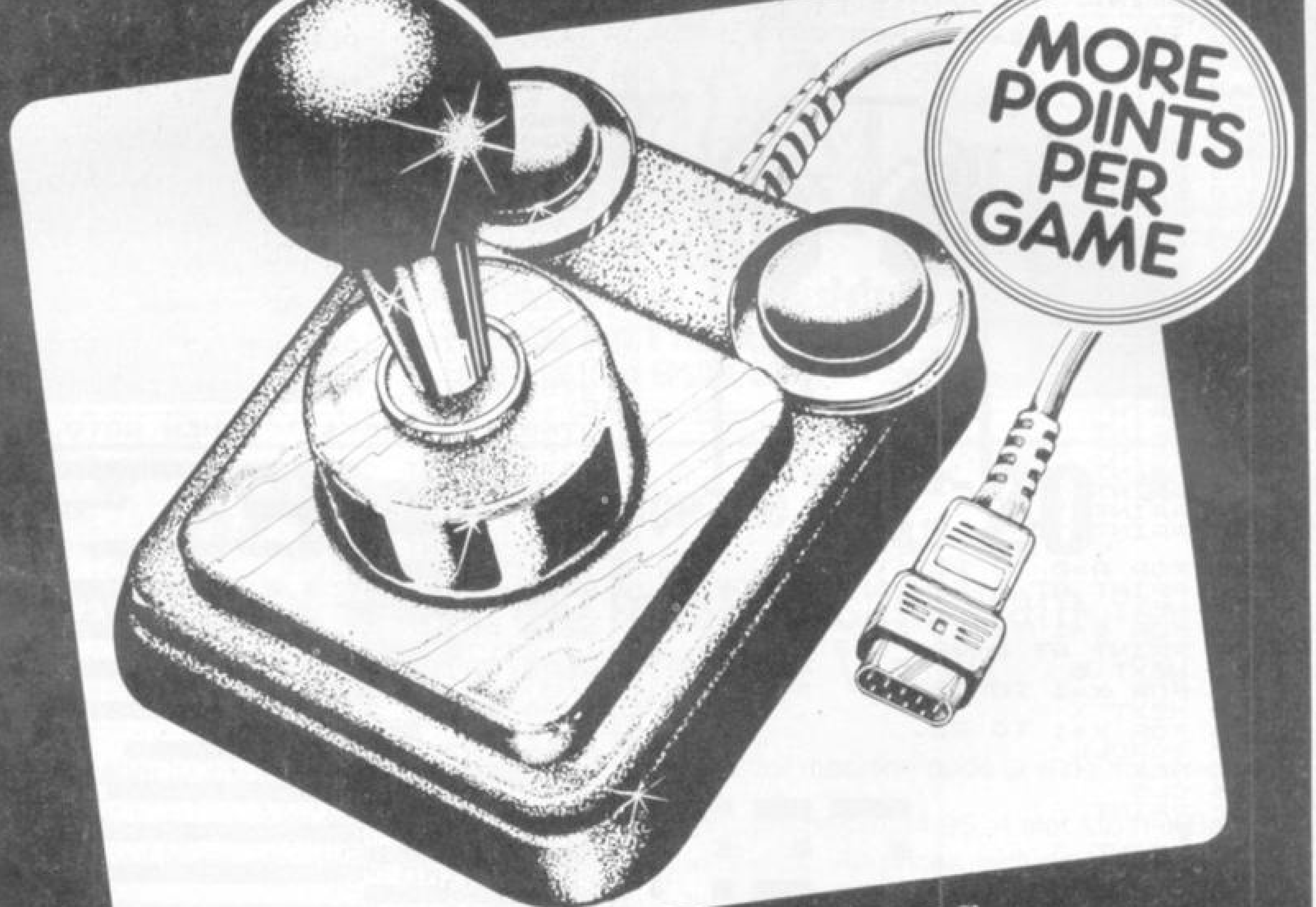

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TANKER

RUNS ON A SPECTRUM IN 16K

BY MIKE LEVER

A life on the ocean wave can be dangerous. There's always someone lurking around ready to blast your tanker right out of the water!

The object of this game is to knock out as many enemy tankers as possible using your anti-tanker gun — making sure that the vital supplies your warring opponent needs just don't get through.

To give those tanker captains that sinking feeling use keys "Z" to move left, "X" for right and "M" to fire.

```
  10
EM  These lines contain User
    Defined Graphics
  20 REM
        1010, 1020, 1030, 1050,
        1120, 2010, and   9330

 100 RANDOMIZE : GO SUB 9000: RE
M usr chrs
 110 GO SUB 9300: REM instr
 120 GO SUB 8000: REM vars
 130 GO SUB 8500: REM screen
 140 FOR n=1 TO 3: FOR o=50 TO 2
0 STEP -5: BEEP .01,o: NEXT o: N
EXT n
 150 REM  Here we go!
1000 FOR a=1 TO no
1010 PRINT AT 8,0; PAPER 6; INK
0;"G": PAUSE 5: PRINT AT 8,0; PA
PER 6; INK 0;"FG": PAUSE 5: PRIN
T AT 8,0; PAPER 6; INK 0;"EFG":
PAUSE 5
1020 FOR b=1 TO 29: BEEP .005,-1
5: PRINT AT 8,b-1; PAPER 6; INK
0;" ";"EFG"
1030 PRINT AT 21,pos1; PAPER 1;"
 ";AT 21,pos; INK 7; PAPER 1;"A
B": LET pos1=pos: LET i=CODE INK
EY$: LET pos=pos+(i=120 AND pos<
27)-(i=122 AND pos>3): IF NOT f
THEN IF i=109 THEN LET f=1: LET
fp=pos: LET xfp=20: BEEP .01,30
1040 IF NOT f THEN GO TO 1100
1050 PRINT AT xfp+1,fp; PAPER 1;
" " AND xfp<>20;AT xfp,fp; INK
7;"CD": IF xfp=9 THEN GO TO 2000
1060 LET xfp=xfp-1: GO TO 1110
1100 FOR n=1 TO 4: NEXT n
1110 NEXT b
1120 PRINT AT 8,29; PAPER 6; INK
 0;" EF": PAUSE 5: PRINT AT 8,30
; INK 0; PAPER 6;" E": PAUSE 5:
PRINT AT 8,31; PAPER 6;" ": LET
m=m+1: GO SUB 8510
1140 FOR n=20 TO 40 STEP 10: BEE
P .1,n: NEXT n: NEXT a
1150 IF f THEN PRINT AT xfp+1,fp
; PAPER 1;" "
1160 FOR n=1 TO 100: NEXT n
1170 PRINT AT 12,11; INK 1;"GAME
 OVER": INK 6: OVER 1: FOR x=10
3 TO 8 STEP -1: PLOT 0,x: DRAW 2
55,0: BEEP .005,x/2: NEXT x: OVE
R 0
1190 INK 2: PRINT AT 14,1; FLASH
 1; PAPER 6;"PRESS ANY KEY FOR A
NOTHER GAME"
1200 IF INKEY$="" THEN FOR n=30
TO 50: BEEP .005,n: NEXT n: GO T
O 1200
1210 RUN 120
2000 IF fp<b OR fp>b+2 THEN LET
f=0: PRINT AT 9,fp; PAPER 1;" "
: GO TO 1110
2010 PRINT AT xfp,fp; PAPER 1;"
 ": FOR n=6 TO 10: FOR p=1 TO 5:
 PRINT AT 8,b; PAPER 6; INK p;"E
FG": BEEP .01,n*p: NEXT p: NEXT
n: FOR n=40 TO 50: PRINT AT 8,b;
 PAPER 6; INK 2; OVER 1;"HHH": B
EEP .01,n: PRINT AT 8,b; PAPER 6
; OVER 1;"   ": BEEP .01,55-n: N
EXT n: PRINT AT 8,b; PAPER 6;"
 ": LET h=h+1: PAUSE 30: GO SUB
8510: LET f=0: GO TO 1140
8000 LET h=0: LET m=0
8010 LET pos=14: LET f=0: LET po
s1=pos
8020 LET no=INT (RND*15)+10
8400 RETURN
8500 BORDER 3: INK 7: PAPER 1: B
RIGHT 1: CLS : PRINT PAPER 3; FL
ASH 1;" *TANKER* "; FLASH 0; BRI
GHT 0;"  HITS:    MISSES:    ";
FOR x=1 TO 8: PRINT PAPER 6,,: N
EXT x: PRINT AT 21,0; PAPER 3; B
RIGHT 0; INK 1;"  ▜";AT 21,29;"▛
"
8510 PRINT AT 0,17; BRIGHT 0; PA
PER 3; INK 7;h;AT 0,28;m
8520 RETURN
9000 RESTORE 9100
9010 FOR x=0 TO 7
9020 FOR y=0 TO 7: READ z: POKE
USR (CHR$ (97+x))+y,z: NEXT y
9030 NEXT x
9040 RETURN
9100 DATA BIN 00000011,BIN 00000
011,BIN 00000011,BIN 00000011,BI
N 00000111,BIN 00011111,BIN 0111
1111,255
9110 DATA BIN 11000000,BIN 11000
000,BIN 11000000,BIN 11000000,BI
N 11100000,BIN 11111000,BIN 1111
1110,255
9120 DATA 0,1,1,1,3,1,3,0
9130 DATA 0,BIN 10000000,BIN 100
00000,BIN 10000000,BIN 11000000,
BIN 10000000,BIN 11000000,0
9140 DATA 0,BIN 00000100,BIN 000
00100,BIN 00000110,BIN 00001111,
BIN 01111111,BIN 00111111,BIN 00
011111
9150 DATA 0,0,0,0,BIN 10101000,2
55,255,255
9160 DATA 0,0,0,0,0,BIN 11111110
,BIN 11111100,BIN 11111000
9170 DATA 0,0,0,BIN 10010010,BIN
 01010100,0,BIN 01010100,BIN 100
10010
9300 PAPER 0: INK 7: BRIGHT 1: B
ORDER 0: CLS
9310 PRINT INVERSE 1;"  TANKER
by Mike Levers © 1982 "
9320 PRINT '" The object of this
 simple game"''"is to knock out
as many enemy"''"tankers as poss
ible using your"''"anti - tanker
 (GROAN!) gun,"
9330 PRINT '"which looks like th
is: AB ."''" To move your gun us
e key Z"''"for left and X for ri
ght. To"''"fire press M."
9340 PRINT '' FLASH 1;"      PRES
S ANY KEY TO BEGIN      "
9350 IF INKEY$="" THEN INK INT (
RND*4+4): OVER 1: FOR n=0 TO 19:
 PRINT AT n,0,,: NEXT n: OVER 0:
 GO TO 9350
9360 BEEP .5,10: RETURN
```

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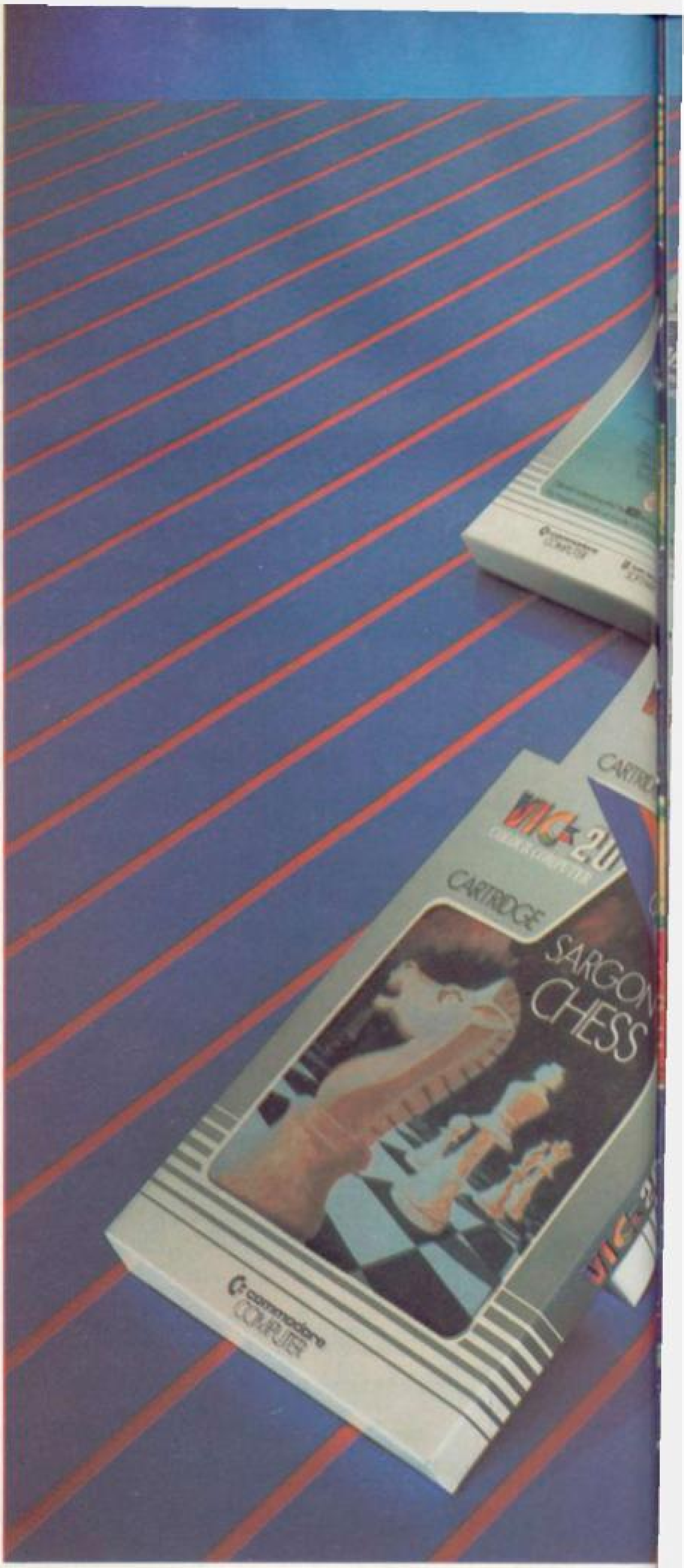

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VCCVG 02/83

"Computerised scrumping! Whatever will they think of next? In my day we had to get out among the apple trees for a bit of fruity fun. And there was always the gamekeeper to keep an eye out for. If he caught you you'd know all about it! All these computerised chappies have to worry about is dropping apples!"

The game is set outside the tall ivy clad wall of an orchard. You are waiting at the bottom of the wall holding a basket on your head. Your computer "accomplice" will throw apples over the wall at random positions. All you have to do is catch as many as you can.

When you have caught 15 apples the game stops momentarily and the computer tells you it has found something to help you. A trestle is drawn on the screen and you hop up onto it. The game continues but you have less time to catch the falling apples.

The trestle drawing routine is continued each time you collect 15 apples in your basket, moving you progressively further up the screen, giving you less and less time to catch the falling fruit.

Once you have missed 10 apples the game stops and the computer tells you your score — a chance to have another crack at those apples!

Variables:

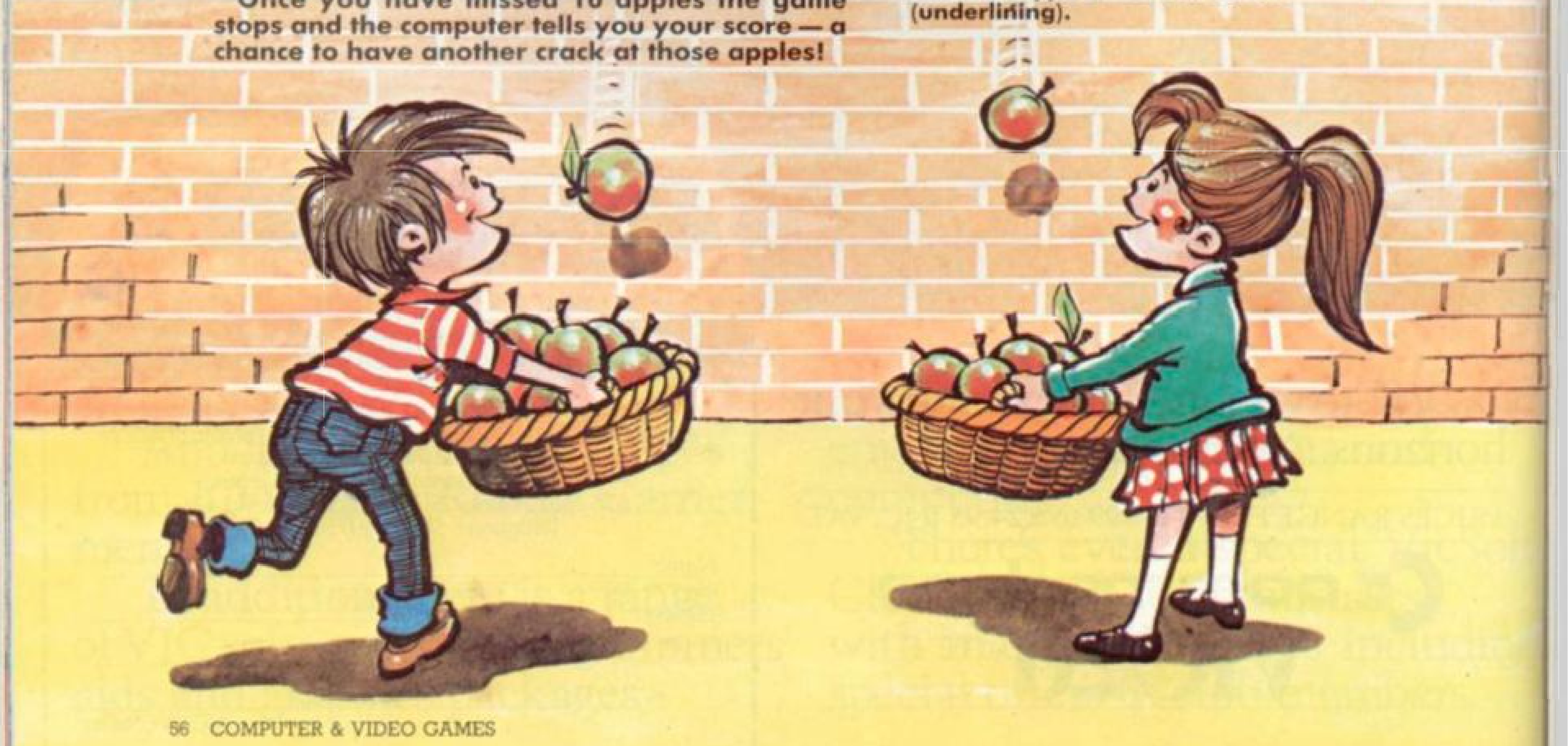
YI: vertical position of basket.
Y: vertical position of man.
XI: horizontal position of basket and man.
APP: number of apples caught.
MISS: number of apples missed.
Q: limit of fall of apples in FOR/NEXT loop.
Z: determines level change (increase by 15 each level).
X: random horizontal position of falling apples.
L: control flag (equals 1 or 10).

The ')' character is a clear screen command (ESC. CTRL. CLEAR) and it appears in lines 10, 100, 2155.

Type line 2155 exactly as it is for correct screen format.

Lines 3050, 3070, 5100, 5130, 5140, 5160, 5340 should have the words between quotation marks typed in INVERSE video.

Also lines 5010-5070 should have the *'s typed in alternate INVERSE video. In line 5250 type 21 CONTROL M's (underlining).



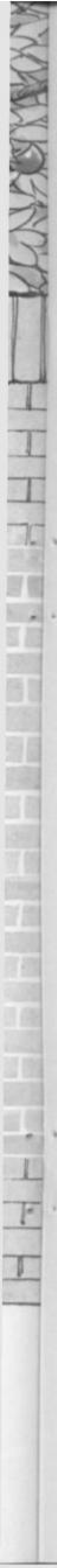


Illustration: Terry Rogers

RUNS ON AN ATARI 400/800 IN 16K

over the orchard wall

BY PETER AND MARK WRIGHT

```
1 REM OVER THE ORCHARD WALL BY PETER & M
ARK WRIGHT AUGUST 1982.
3 GOSUB 5000
4 Q=79:Z=15
7 GOSUB 1000:GOTO 10
8 GOSUB 1002
10 ? "}WE'VE GOT ";APP;" APPLES SO FAR"
15 IF APP>=15 THEN 750
20 POKE 704,52:POKE 705,218:COLOR 1:PLOT
 0,15:DRAWTO 159,15
25 X=INT(RND(1)*120)+15:POKE 53278,0
29 REM MAIN PLAYING LOOP
30 FOR I=18 TO Q:B=STICK(0)
35 SOUND 0,I+11,10,8
40 COLOR 3:PLOT X,I:DRAWTO X+2,I:COLOR 0
:PLOT X,I-2:DRAWTO X+2,I-2
42 IF B=15 THEN POKE HPOSP0,X1:POKE HPOS
P1,X1:GOTO 50
44 IF B=11 AND X1>=67 THEN X1=X1-2:POKE
HPOSP0,X1:POKE HPOSP1,X1:SOUND 1,0,1,8:G
OTO 50
46 IF B=7 AND X1<=177 THEN X1=X1+2:POKE
HPOSP0,X1:POKE HPOSP1,X1:SOUND 1,0,1,8:G
OTO 50
50 IF PEEK(53252)<>0 THEN APP=APP+1:GOTO
 600
60 IF I=Q THEN MISS=MISS+1:IF MISS=10 TH
EN 3000
70 COLOR 1:IF I=Q THEN GOSUB 150
71 SOUND 1,0,0,0:NEXT I
74 REM CHECKS FOR NEXT LEVELS
75 IF APP=15 AND L=0 THEN ? "HOLD ON A M
INUTE, I'VE FOUND A PLANK":SOUND 0,0,0,0
:L=1:GOTO 100
80 IF APP=Z THEN ? "HOLD ON A MINUTE, I'
VE FOUND ANOTHER":? "PLANK":SOUND 0,0,0,
0:GOTO 100
90 GOTO 25
100 FOR I=1 TO 2000:NEXT I:Q=Q-10:Z=Z+15
:Y=Y-20:Y1=Y1-20:? "}":GOTO 8
149 REM SOUND AND TEXT WINDOW INFORMATIO
N
150 FOR J=1 TO 5:SOUND 0,150,12,14:NEXT
J:FOR J=14 TO 0 STEP -1:SOUND 0,150,10,J
:NEXT J:RETURN
600 FOR N=I TO I-2 STEP -1:COLOR 0:PLOT
X,N:DRAWTO X+2,N:NEXT N:I=83:POKE 53278,
0
605 FOR J=1 TO 5:SOUND 0,40,10,14:NEXT J
:FOR J=14 TO 0 STEP -1:SOUND 0,40,10,J:N
EXT J
610 POKE 656,0:? "WE'VE GOT ";APP;" SO F
AR, GREAT 'IN IT!!!!":GOTO 71
749 REM PLANK AND TRESTLE DRAWING ROUTIN
ES
750 COLOR 1:PLOT 0,71:DRAWTO 159,71:PLOT
 0,70:DRAWTO 159,70
760 PLOT 20,70:DRAWTO 25,79:PLOT 20,70:D
RAWTO 15,79:PLOT 140,70:DRAWTO 145,79:PL
OT 140,70:DRAWTO 135,79
770 IF APP=15 THEN 20
780 COLOR 1:PLOT 0,61:DRAWTO 159,61:PLOT
 0,60:DRAWTO 159,60
790 PLOT 20,60:DRAWTO 25,69:PLOT 20,60:D
RAWTO 15,69:PLOT 140,60:DRAWTO 145,69:PL
OT 140,60:DRAWTO 135,69
800 IF APP=30 THEN 20
810 COLOR 1:PLOT 0,51:DRAWTO 159,51:PLOT
 0,50:DRAWTO 159,50
820 PLOT 20,50:DRAWTO 25,59:PLOT 20,50:D
RAWTO 15,59:PLOT 140,50:DRAWTO 145,59:PL
OT 140,50:DRAWTO 135,59
830 IF APP=45 THEN 20
840 COLOR 1:PLOT 0,41:DRAWTO 159,41:PLOT
 0,40:DRAWTO 159,40
850 PLOT 20,40:DRAWTO 25,49:PLOT 20,40:D
RAWTO 15,49:PLOT 140,40:DRAWTO 145,49:PL
OT 140,40:DRAWTO 135,49
860 IF APP=60 THEN 20
870 COLOR 1:PLOT 0,31:DRAWTO 159,31:PLOT
 0,30:DRAWTO 159,30
880 PLOT 20,30:DRAWTO 25,39:PLOT 20,30:D
RAWTO 15,39:PLOT 140,30:DRAWTO 145,39:PL
OT 140,30:DRAWTO 135,39
890 IF APP=75 THEN 20
900 GOTO 20
999 REM PLAYER/MISSILE GRAPHICS SET UP
1000 GRAPHICS 7:X1=125:Y=172:Y1=180
1002 GRAPHICS 7+32:COLOR 1:SETCOLOR 2,12
,4:SETCOLOR 4,0,6:SETCOLOR 0,14,4:POKE 7
52,1:X1=125
1004 POKE 656,1:POKE 657,11:? "HANG ON A
 MINUTE!"
1005 POKE 704,6:POKE 705,6
1010 A=PEEK(106)-24:POKE 54279,A:PMBASE=
256*A
1020 POKE 559,62
1030 POKE 53277,3
1040 POKE HPOSP0,X1:POKE HPOSP1,X1
1050 FOR J=PMBASE+1024 TO PMBASE+1470:PO
KE J,0:NEXT J
1070 FOR J=PMBASE+1024+Y TO PMBASE+1032+
Y:READ A:POKE J,A:NEXT J
1080 DATA 255,255,255,255,126,126,126,12
6,60
1090 FOR I=PMBASE+1280+Y1 TO PMBASE+1290
+Y1:READ A:POKE I,A:NEXT I
1100 DATA 195,153,153,255,60,60,60,60,10
2,102,231
1110 POKE 623,1
1140 RESTORE
1999 REM PLAYFIELD SET UP
2000 SETCOLOR 1,9,8:COLOR 2:PLOT 159,13:
DRAWTO 159,0:DRAWTO 0,0
2010 POSITION 0,14:POKE 765,2:XIO 18,#6,
0,0,"S:"
2015 COLOR 3:PLOT 4,14:DRAWTO 17,14
2020 PLOT 5,13:DRAWTO 15,13:PLOT 6,12:DR
AWTO 14,12:PLOT 9,11:DRAWTO 11,11:PLOT 1
0,10:DRAWTO 12,10
2030 COLOR 2:PLOT 7,13:PLOT 10,12
2035 COLOR 3:PLOT 47,14:DRAWTO 78,14:PLO
T 49,13:DRAWTO 77,13
2040 PLOT 50,12:DRAWTO 75,12:PLOT 53,11:
```

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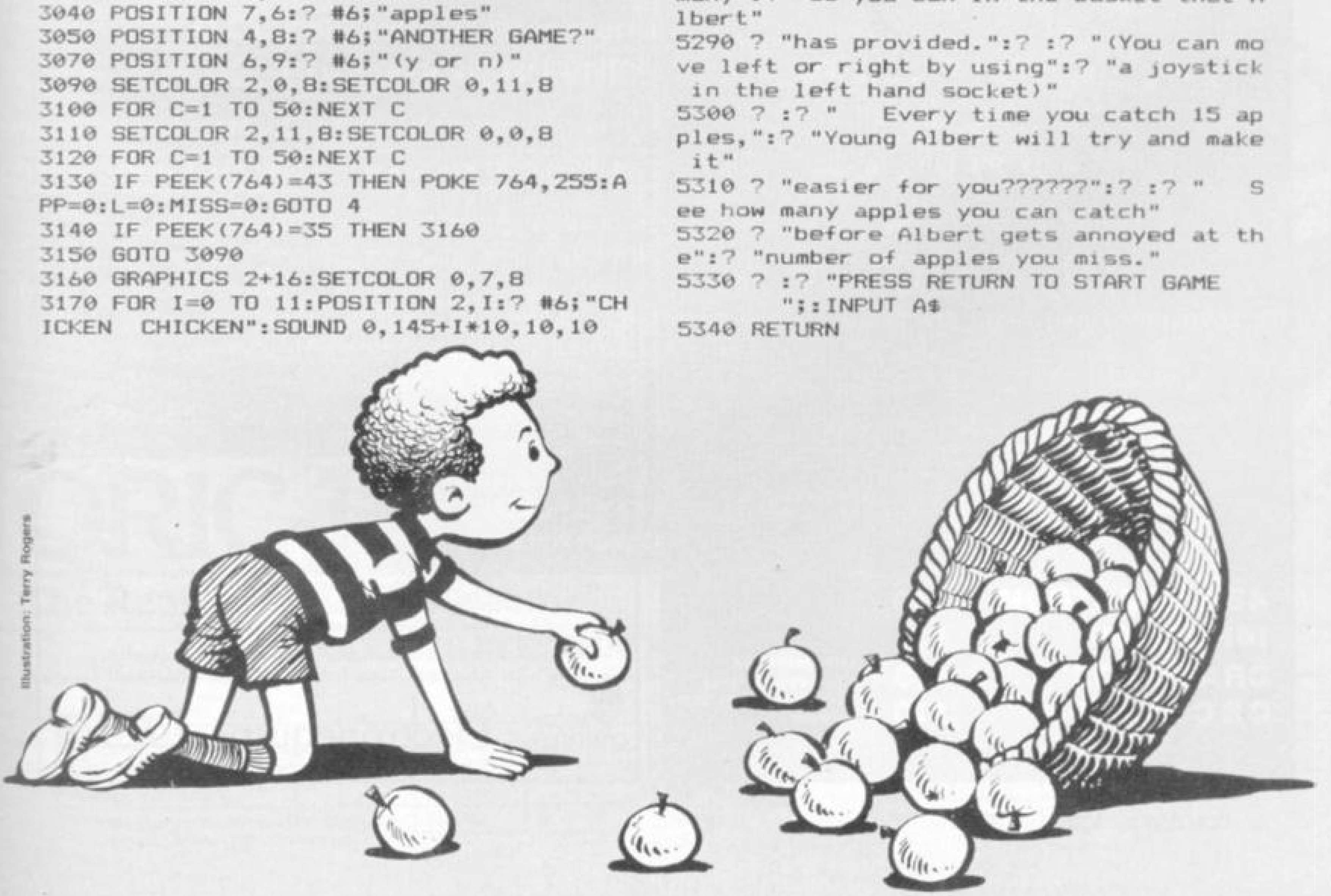
```
DRAWTO 74,11:PLOT 58,10:DRAWTO 72,10
2050 PLOT 60,9:DRAWTO 71,9:PLOT 63,8:DRA
WTO 70,8:PLOT 64,7:DRAWTO 68,7:PLOT 65,6
:DRAWTO 68,6
2060 COLOR 2:PLOT 63,9:PLOT 70,9:PLOT 67
,6:PLOT 65,10:PLOT 72,11:PLOT 49,14:PLOT
 49,14:PLOT 53,13:PLOT 58,13
2070 COLOR 3:PLOT 110,14:DRAWTO 125,14:P
LOT 112,13:DRAWTO 124,13:PLOT 115,12:DRA
WTO 123,12
2080 PLOT 118,11:DRAWTO 121,11:PLOT 119,
10:DRAWTO 121,10
2090 PLOT 140,14:DRAWTO 150,14:PLOT 141,
13:DRAWTO 148,13:PLOT 143,12:DRAWTO 148,
12:PLOT 146,11:DRAWTO 149,11
2100 PLOT 147,10:DRAWTO 150,10
2110 COLOR 2:PLOT 114,14:PLOT 123,14:PLO
T 114,13:PLOT 120,13:PLOT 119,12:PLOT 12
1,11:PLOT 144,13:PLOT 148,12
2120 PLOT 146,11:PLOT 142,14:IF L=1 THEN
 RETURN
2130 COLOR 3:FOR I=15 TO 79:T=INT(RND(1)
*15):PLOT 0,I:DRAWTO T,I:NEXT I
2140 COLOR 2:PLOT 4,34:PLOT 7,76:PLOT 4,
18:PLOT 6,25
2150 COLOR 3:FOR I=15 TO 80:T=INT(RND(1)
*20)+140:PLOT 159,I:DRAWTO T,I:NEXT I
2155 ? "}HERE WE ARE OUTSIDE THE ORCHARD
.IF YOUDROP 10 APPLES I'M NOT PLAYING "
2157 ? "PRESS RETURN WHEN YOU'RE READY";
:INPUT A$
2160 RETURN
2999 REM END ROUTINE
3000 POKE 656,0:POKE 657,0:? "
                                   "
3002 ? "YOU'VE MISSED 10 APPLES":SOUND 0
,0,0,0:FOR I=1 TO 1000:NEXT I
3007 POKE HPOSP0,5:POKE HPOSP1,5
3010 GRAPHICS 2+16:SETCOLOR 1,9,8:? #6:?
 #6
3020 ? #6;"     you caught"
3030 POSITION 9,4:? #6;APP
3040 POSITION 7,6:? #6;"apples"
3050 POSITION 4,8:? #6;"ANOTHER GAME?"
3070 POSITION 6,9:? #6;"(y or n)"
3090 SETCOLOR 2,0,8:SETCOLOR 0,11,8
3100 FOR C=1 TO 50:NEXT C
3110 SETCOLOR 2,11,8:SETCOLOR 0,0,8
3120 FOR C=1 TO 50:NEXT C
3130 IF PEEK(764)=43 THEN POKE 764,255:A
PP=0:L=0:MISS=0:GOTO 4
3140 IF PEEK(764)=35 THEN 3160
3150 GOTO 3090
3160 GRAPHICS 2+16:SETCOLOR 0,7,8
3170 FOR I=0 TO 11:POSITION 2,I:? #6;"CH
ICKEN  CHICKEN":SOUND 0,145+I*10,10,10
3180 FOR N=1 TO 50:NEXT N:SOUND 0,0,0,0:
NEXT I
3190 SOUND 0,0,0,0:GOTO 3190
4999 REM OPENING TITLES AND INSTRUCTIONS
5000 GRAPHICS 17:DIM A$(1):HPOSP0=53248:
HPOSP1=53249
5005 ? #6:? #6
5010 ? #6;"  ****************"
5020 ? #6;"  *              *"
5030 ? #6;"  *   over the   *"
5040 ? #6;"  *              *"
5050 ? #6;"  * orchard wall *"
5060 ? #6;"  *              *"
5070 ? #6;"  ****************"
5080 ? #6
5090 ? #6;"          BY":? #6
5100 ? #6;"PETER & MARK WRIGHT"
5110 ? #6:? #6:? #6:? #6
5120 ? #6;
5130 ? #6;"  do you require"
5140 ? #6;"  instructions ?"
5150 ? #6
5160 ? #6;"           (y or n)"
5170 SETCOLOR 2,15,8:SETCOLOR 0,11,8
5180 FOR J=1 TO 50:NEXT J
5190 SETCOLOR 0,15,8:SETCOLOR 2,11,8
5200 FOR J=1 TO 50:NEXT J
5210 IF PEEK(764)=43 THEN 5240
5220 IF PEEK(764)=35 THEN POKE 764,255:R
ETURN
5230 GOTO 5170
5240 POKE 764,255:GRAPHICS 0:SETCOLOR 2,
13,2:SETCOLOR 4,14,4
5250 ? :? "OVER THE ORCHARD WALL":? "<21
 CTRL M>"
5260 ? "Young Albert Atari has managed t
o ":? "climb the ivy clad orchard wall,
and"
5270 ? "has disappeared inside.":? :? "
  He will throw the apples over the"
5280 ? "wall. You must try and catch as
many":? "as you can in the basket that A
lbert"
5290 ? "has provided.":? :? "(You can mo
ve left or right by using":? "a joystick
 in the left hand socket)"
5300 ? :? "   Every time you catch 15 ap
ples,":? "Young Albert will try and make
 it"
5310 ? "easier for you??????":? :? "   S
ee how many apples you can catch"
5320 ? "before Albert gets annoyed at th
e":? "number of apples you miss."
5330 ? :? "PRESS RETURN TO START GAME
     ";:INPUT A$
5340 RETURN
```



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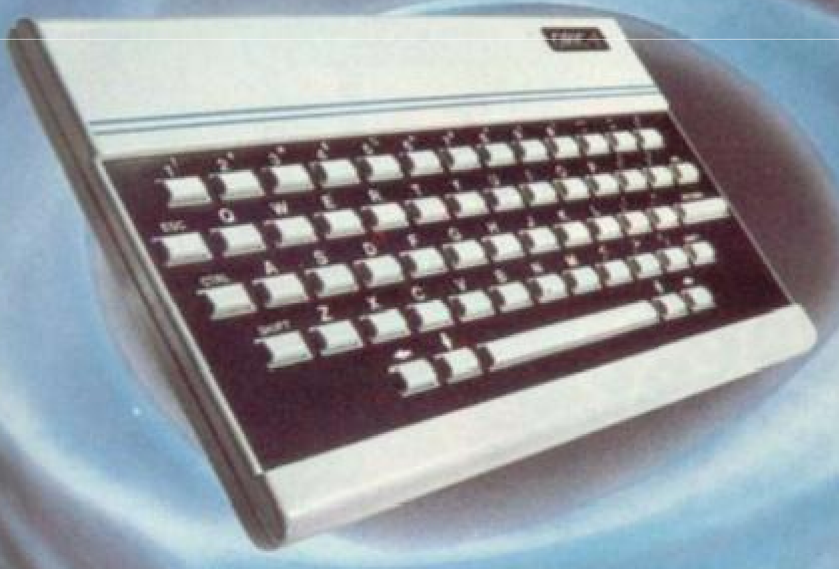

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FRUIT MACHINE

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Yes, this is a game for all of you who like feeding those three-reeled bandits — and it won't cost you a penny!

As this is a very long program for the unexpanded Vic-20 the instructions included are very brief — so for all of you with extra memory the first job is to type in some extra instructions.

When the insert coin sign shows press "I" then "f1" to run. "f7" shows your profit and losses. Now and again your Vic will present you with the chance to "gamble or collect" which could double or treble your winnings.

Any one or two reels can be "HELD" by pressing the corresponding number on the keyboard — "1, 2 or 3".

In lines 800-865 certain graphic characters appear. These are merely shifted letters which will appear as upper case letters when the program is run.

Line 845 graphics are for the word "UP", line 847 for "DOWN" and line 849 for "BROKE EVEN".

The two strange characters in lines 800 and 875 are a reversed "N" and a reversed "/". These are used to change the computer from upper to lower case and vice versa; they can be obtained by the following method.

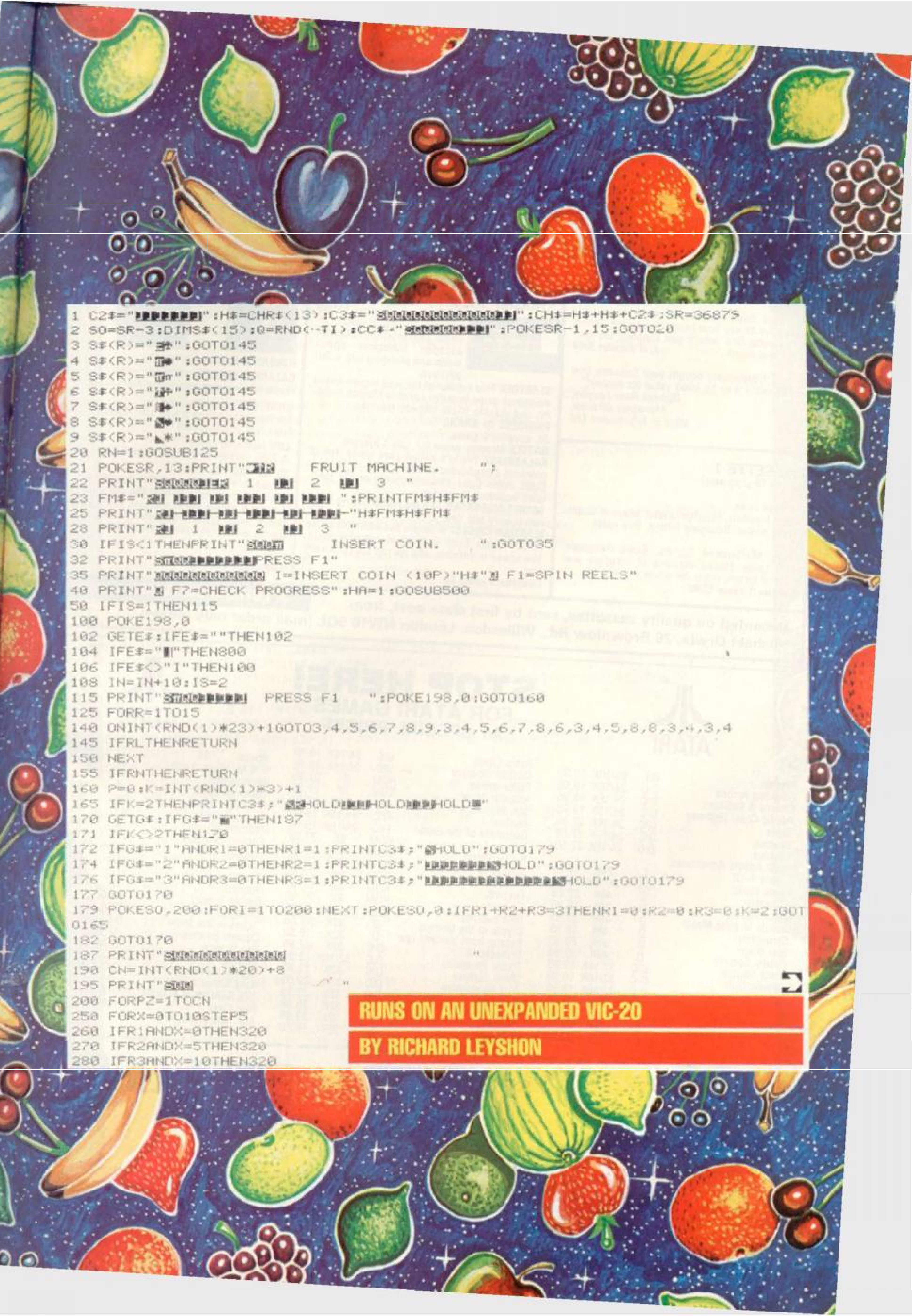
Type the program line as shown but leave a space where this character is to appear and press return.

Using the cursor control keys, position the cursor in the space you have left, press CTRL and RVS ON at the same time. Now press the key needed to produce the symbol. In line 800 the key is "N". In line 875 it is "SHIFTED N".

Now press return and continue with the program.

The symbol in line 104 is achieved by pressing the "f7" key (in quotes). Line 170 is "f1" in quotes, the listing was done on a Pet printer which does not have the "£" sign, so when you come to a "/" (in quotes) just press the "£" key.

Illustration: Dorian Cross



```
1 C2$="▮▮▮▮▮▮▮":H$=CHR$(13):C3$="▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮":CH$=H$+H$+C2$:SR=36879
2 SO=SR-3:DIMS$(15):Q=RND(-TI):CC$="▮▮▮▮▮▮▮▮▮":POKESR-1,15:GOTO20
3 S$(R)="▮▮":GOTO145
4 S$(R)="▮▮":GOTO145
5 S$(R)="▮▮":GOTO145
6 S$(R)="▮▮":GOTO145
7 S$(R)="▮▮":GOTO145
8 S$(R)="▮▮":GOTO145
9 S$(R)="▮*":GOTO145
20 RN=1:GOSUB125
21 POKESR,13:PRINT"▮▮▮    FRUIT MACHINE.    ";
22 PRINT"▮▮▮▮▮▮▮▮  1  ▮▮▮  2  ▮▮▮  3  "
23 FM$="▮▮▮ ▮▮▮▮ ▮▮▮ ▮▮▮▮ ▮▮▮ ▮▮▮▮ ":PRINTFM$H$FM$
25 PRINT"▮▮▮-▮▮▮▮-▮▮▮-▮▮▮▮-▮▮▮-▮▮▮▮-"H$FM$H$FM$
28 PRINT"▮▮▮  1  ▮▮▮  2  ▮▮▮  3  "
30 IFIS<1THENPRINT"▮▮▮▮     INSERT COIN.    ":GOTO35
32 PRINT"▮▮▮▮▮▮▮▮▮▮▮▮PRESS F1"
35 PRINT"▮▮▮▮▮▮▮▮▮▮▮▮▮▮ I=INSERT COIN (10P)"H$"▮ F1=SPIN REELS"
40 PRINT"▮ F7=CHECK PROGRESS":HA=1:GOSUB500
50 IFIS=1THEN115
100 POKE198,0
102 GETE$:IFE$=""THEN102
104 IFE$="▮"THEN800
106 IFE$<>"I"THEN100
108 IN=IN+10:IS=2
115 PRINT"▮▮▮▮▮▮▮▮▮  PRESS F1   ":POKE198,0:GOTO160
125 FORR=1TO15
140 ONINT(RND(1)*23)+1GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5,8,8,3,4,3,4
145 IFRLTHENRETURN
150 NEXT
155 IFRNTHENRETURN
160 P=0:K=INT(RND(1)*3)+1
165 IFK=2THENPRINTC3$;"▮▮HOLD▮▮▮▮HOLD▮▮▮▮HOLD▮"
170 GETG$:IFG$="▮"THEN187
171 IFK<>2THEN170
172 IFG$="1"ANDR1=0THENR1=1:PRINTC3$;"▮HOLD":GOTO179
174 IFG$="2"ANDR2=0THENR2=1:PRINTC3$;"▮▮▮▮▮▮▮▮HOLD":GOTO179
176 IFG$="3"ANDR3=0THENR3=1:PRINTC3$;"▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮HOLD":GOTO179
177 GOTO170
179 POKESO,200:FORI=1TO200:NEXT:POKESO,0:IFR1+R2+R3=3THENR1=0:R2=0:R3=0:K=2:GOT
0165
182 GOTO170
187 PRINT"▮▮▮▮▮▮▮▮▮▮▮▮▮▮                    "
190 CN=INT(RND(1)*20)+8
195 PRINT"▮▮▮                      "
200 FORPZ=1TOCN
250 FORX=0TO10STEP5
260 IFR1ANDX=0THEN320
270 IFR2ANDX=5THEN320
280 IFR3ANDX=10THEN320
```

RUNS ON AN UNEXPANDED VIC-20

BY RICHARD LEYSHON

MICHAEL ORWIN'S ZX81 CASSETTES

The best software (by various authors) at low prices

QUOTES

"Michael Orwin's £5 Cassette Two is very good value. It contains 10 stolid well designed games which work, offer plenty of variety and choice, and are fun."

from the ZX Software review in Your Computer, May '82 issue.

"I had your Invaders-React cassette . . . I was delighted with this first cassette."

P. Rubython, London NW10

"I have been intending to write to you for some days to say how much I enjoy the games on 'Cassette One' which you supplied me with earlier this month."

E. H. London SW4

". . . I previously bought your Cassette One and consider it to be good value for money!"

Richard Ross-Langley,
Managing Director,
Mine of Information Ltd.

CASSETTE 1

(eleven 1k programs)

machine code:
React, Invaders, Phantom aliens, Maze of death, Planet lander, Bouncing letters, Bug splat.
Basic:
IChing, Mastermind, Robots, Basic Hangman.
PLUS Large screen versions of Invaders and Maze of Death, ready for when you get 16k.

Cassette 1 costs £3.80

CASSETTE 2

Ten games in Basic for 16k ZX81

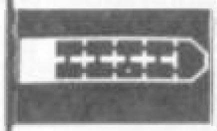
Cassette Two contains Reversi, Awari, Laser Bases, Word Mastermind, Rectangles, Crash, Roulette, Pontoon, Penny Shoot and Gun Command.

Cassette 2 costs £5.

CASSETTE 3

8 programs for 16k ZX81

STARSHIP TROJAN



Repair your Starship before disaster strikes. Hazards include asphyxiation, radiation, escaped biological specimens and plunging into a Supernova.

STARTREK This version of the well known space adventure game features variable Klingon mobility, and graphic photo torpedo tracking.

PRINCESS OF KRAAL
An adventure game.

BATTLE Strategy game for 1 to 4 players.

KALABRIASZ World's silliest card game, full of pointless complicated rules.

CUBE Rubik Cube simulator, with lots of functions including 'Backstep'.

SECRET MESSAGES This message coding program is very txlp qexi jf.

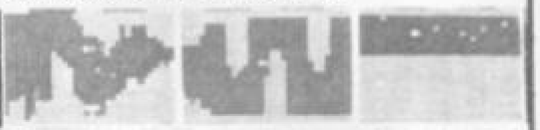
MARTIAN CRICKET A simple but addictive game (totally unlike Earth cricket) in machine code. The speed is variable, and its top speed is very fast.

Cassette 3 costs £5.

CASSETTE 4

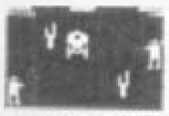
8 games for 16k

ZX-SCRAMBLE (machine code)

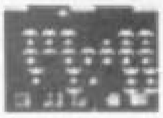


Bomb and shoot your way through the fortified caves.

GUNFIGHT (machine code)



INVADERS (machine code)



FUNGALOIDS (machine code)

GALAXY INVADERS (machine code)
Fleets of swooping and diving alien craft.

SNAKEBITE (machine code)
Eat the snake before it eats you. Variable speed (very fast at top speed)

LIFE (machine code)
A ZX81 version of the well known game.

3D TIC-TAC-TOE (Basic)
Played on a 4×4×4 board, this is a game for the brain. It is very hard to beat the computer at it.

7 of the 8 games are in machine code, because this is much faster than Basic. (Some of these games were previously available from J. Steadman).

Cassette 4 costs £5.

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```
300 FORY=4TO1STEP-1:S$(Y+X+1)=S$(Y+X):NEXT
310 R=X+1:RL=1:GOSUB140
320 NEXT
500 PRINTCC$;:FORI=1TO5:PRINTS$(I)"▒▒";:NEXT
520 PRINTCC$;C2$;:FORI=6TO10:PRINTS$(I)"▒▒";:NEXT
540 PRINTCC$;C2$;C2$;:FORI=11TO15:PRINTS$(I)"▒▒";:NEXT:RN=0
550 IFPZ<>CNTHENNEXT
560 IFHATHENHA=0:RETURN
600 P2=7837:S1=PEEK(P2):S2=PEEK(P2+7):S3=PEEK(P2+14)
602 IFS1=42ANDS2=S1ANDS3=S1THENX=10000:GOTO900
605 IFS1=90ANDS2=90ANDS3=90THENX=1500:GOTO900
607 IFS1=90ANDS2=90ANDS3=42THENX=500:GOTO900
610 IFS1=88ANDS2=S1ANDS3=S1ORS1=94ANDS2=S1ANDS3=S1THENX=400:GOTO900
615 IFS1=90ANDS2=S1THENX=350:GOTO900
617 IFS1=83ANDS2=S1ANDS3=S1THENX=300:GOTO900
620 IFS1=42ANDS2=S1ORS2=42ANDS3=S2THENX=250:GOTO900
630 IFS1=88ANDS2=S1ANDS3=42ORS1=94ANDS2=S1ANDS3=42THENX=200:GOTO900
640 IFS1=88ANDS2=S1ORS2=88ANDS3=S2THENX=30:GOTO900
650 IFS1=94ANDS2=S1ORS2=94ANDS3=S2THENX=30:GOTO900
660 IFS1=42ORS2=42ORS3=42THENX=10:GOTO900
670 IFS1=S2ANDS2=S3THENX=20:GOTO900
700 R1=0:R2=0:R3=0:IS=IS-1:IFIS<1ANDPTHEN21
710 IFIS<1THEN30
712 IFPTHEN21
720 GOTO115
800 POKESR,90:PRINT"▒▒▒▒DU HAVE PUT INTO ME"
805 IFIN<91THENPRINTH$;IN;"▒P":GOTO820
810 PRINT"▒\"IN/100;:IFIN/100=INT(IN/100)THENPRINT".00":GOTO820
815 PRINT"▒0"
820 PRINTH$;"▒ DU HAVE WON BACK";H$
830 IFOT<91THENPRINTOT;"▒P":GOTO845
840 PRINT"▒\"OT/100;:IFOT/100=INT(OT/100)THENPRINT"▒.00":GOTO845
842 PRINT"▒0"
845 IFOT>IN THENPRINT"▒▒ DU ARE ▒/▒":GOTO855
847 IFOT<IN THENPRINT"▒▒ DU ARE ▒┤o/▒":GOTO855
849 PRINTH$;"▒ DU HAVE ▒|_┌/‾/ ‾X‾/▒":GOTO860
855 R=ABS(IN-OT):IFR<91THENPRINTH$;R;"▒P":GOTO860
857 PRINTH$;"\"R/100;:IFR/100=INT(R/100)THENPRINT"▒.00":GOTO860
858 PRINT"▒0"
860 PRINTH$;"▒▒▒RESS ▒▒ TO CONTINUE"
865 PRINT"▒▒▒NY OTHER KEY TO END"
867 POKE198,0
870 GETB$:IFB$=""THEN870
875 IFB$="C"THENPRINT"▒":GOTO21
880 SYS8
900 FORA=1TO25:FORB=185TO240STEP2:POKESO,B:NEXTB:POKESO,0
910 FORB=1TO30:NEXTB,A:POKESO,0:POKE198,0
920 PRINT"▒▒▒▒▒▒AMBLE OR ▒▒OLLECT?"
930 GETG$:IFG$<>"G"ANDG$<>"C"THEN930
935 PRINT"▒▒                   "
940 IFG$="C"THENOT=OT+X:X=0:GOTO700
960 POKESR,234:PRINT"▒▒▒▒"CH$"NOTHING"CH$"EVEN"CH$"NOTHING"CH$"DOUBLE"
970 PRINTH$C2$"NOTHING"CH$"TREBLE"
980 W=7819:FORSD=1TOINT(RND(1)*25)+5:POKEW,PEEK(W)+128:FORI=1TO100:NEXT
990 POKEW,PEEK(W)-128:W=W+44:IFW>8058THENW=7819
1000 NEXT:POKEW,PEEK(W)+128
1010 IFPEEK(W)=133THENOT=OT+X
1020 IFPEEK(W)=132THENOT=OT+2*X
1030 IFPEEK(W)=148THENOT=OT+3*X
1040 FORI=1TO3000:NEXT:X=0:P=1:GOTO700
```

RUNS ON A DRAGON

IN 32K

BY A. CHAPMAN

MISSILE

THE cities of planet Tanith are peaceful places with some of the most beautiful buildings in any city of the Sol system. But that peace will soon be shattered and the graceful sky towers will soon be burning — unless you can halt the deadly rain of missiles heading toward the planet from the depths of space where a hostile power is lurking . . .

This game for the new Dragon is an adaptation of the video favourite. It's got all the features of the arcade game and should test even the best Missile Commanders.

Line the oncoming missiles up in the sights of your anti-missile laser and blast away. Don't let any get through to destroy your planet's cities.

Use keys 1, 2 and 3 to fire and keys U-up, H-left, J-right, N-down to move your laser-sight.

```
10 REM*****MISSILE COMMAND******
20 REM*************BY*************
30 REM**********A.CHAPMAN**********
50 DIM CI$(7)
60 HI=0
70 DIM A(20),B(20),C(4),M(3),M1(3)
80 R=5:NI=1
90 S=0
100 FOR N=1 TO 250 STEP 10:SOUND N,1:NEXT N
110 C(1)=0:C(2)=0:C(3)=0:C(4)=0
120 K=0:FOR N=1 TO 4:IF C(N)=1 THEN K=K+1:NEXT N
130 IF K=4 THEN 780
140 FOR N=1 TO 250 STEP 10:SOUND N,1:NEXT N
150 A1=127:B1=91:A=127:B=91:M(1)=3:M(2)=3:M(3)=3
   :M1(1)=42:M1(2)=127:M1(3)=212
160 FOR N=1 TO NI:B(N)=1:A(N)=RND(256)-1:NEXT N
170 PMODE 1,1:SCREEN 1,0:PCLS1
180 '********set up screen********
190 LINE(0,180)-(255,192),PSET,BF
200 C$="U"
210 CI$(1)="C4BM32,180;E10;F10":CI$(2)="C4
   BM117,180;E10;F10":CI$(3)="C4;BM202,18
0;E10;F10"
220 CI$(4)="C4;BM61,180;U8;R20;D8":CI$(5)
   ="C4;BM91,180;U8;R20;D8":CI$(6)="C4;BM1
46,180;U8;R20;D8":CI$(7)="C4;BM177,180;U8;R20;D8"
230 FOR N=4 TO 7
240 IF C(N-3)=1 THEN 260
250 DRAW CI$(N)
260 NEXT N
270 DRAW CI$(1):DRAW CI$(2):DRAW CI$(3)
280 FOR N=1 TO NI:IF A(N)=-1 THEN 310
290 PSET(A(N),B(N),3):B(N)=B(N)+1
   :A(N)=A(N)+RND(2)-RND(2)
300 IF A(N)<0 THEN A(N)=0
305 IF A(N)>255 THEN A(N)=255
310 NEXT N
320 B$=INKEY$
```

Variables

CI$(N): contains information for drawing bases and cities.

HI: high score.

A(N),B(N): x,y co-ordinates of missiles.

C(N): whether city destroyed (1) or built (0).

A,B,A1,B1: position of laser-sight.

M(N): number of missiles in base N.

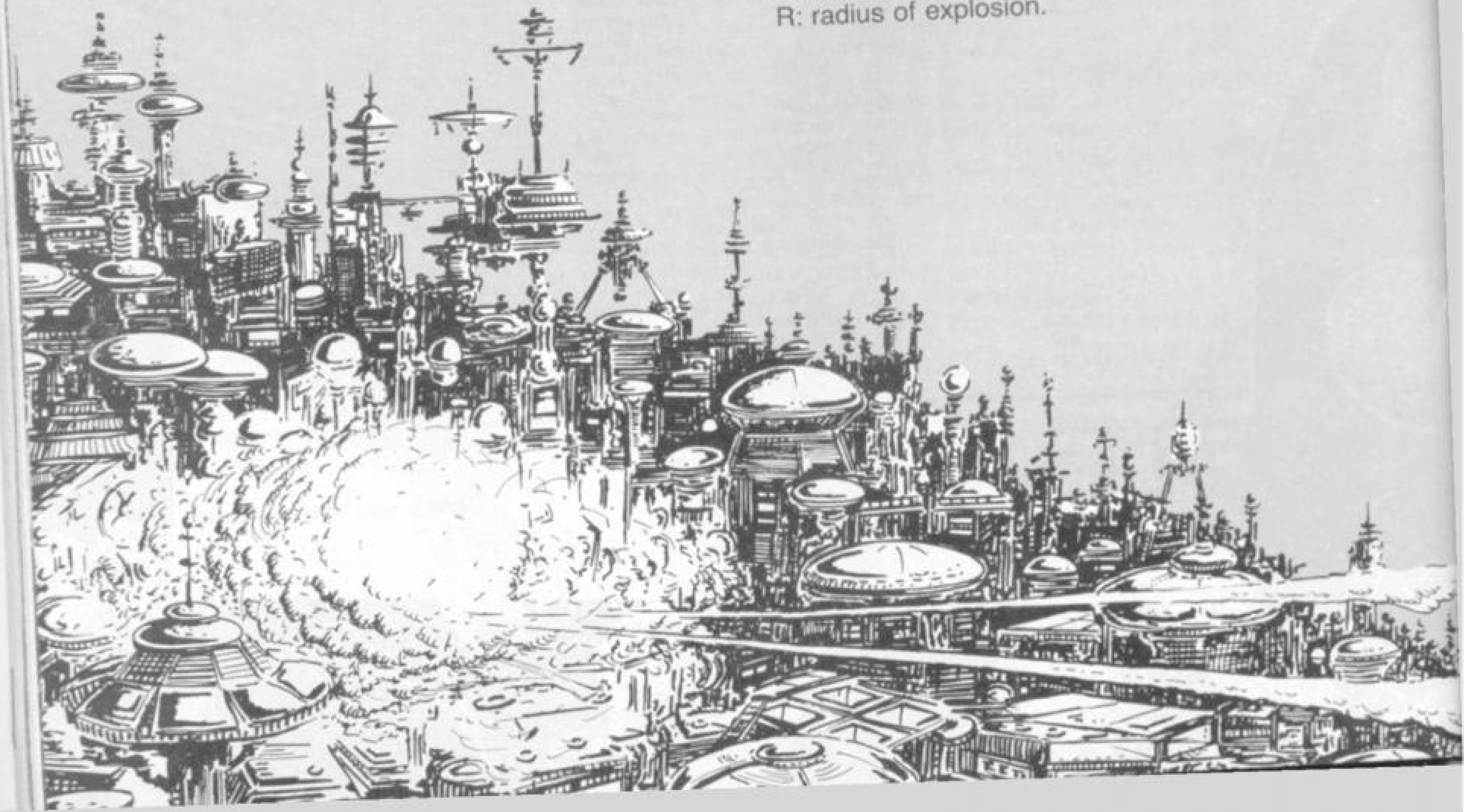
M1(N): x co-ordinates of top of bases.

B$,C$: movement.

S: score.

NI: number of missiles.

R: radius of explosion.



COMMAND

```
330 IF B$="J"OR B$="H"OR B$="U"OR B$="N"THEN 350
340 B$=C$
350 C$=B$
360 IF B$="J"THEN A=A+5:IF A>255 THEN A=255
370 IF B$="H"THEN A=A-5:IF A<0 THEN A=0
380 IF B$="N"THEN B=B+5:IF B>170 THEN B=170
390 PSET(A1,B1,1)
400 PSET(A,B,2)
410 A1=A:B1=B
420 SOUND 155,1
430 IF B$="U"THEN B=B-5:IF B<10 THEN B=10
440 A$=INKEY$:IF A$="1"OR A$="2"OR A$="3"THEN 500
450 FOR N=1 TO NI:IF A(N)=-1 THEN 490
460 IF B(N)<170 THEN 490
470 IF B(N)>190 THEN A(N)=-1
480 GOSUB 570
490 NEXT N:GOTO 640
500 U=VAL(A$):IF M(U)=0 THEN 450
510 SOUND 200,5
520 M(U)=M(U)-1
530 LINE(M1(U),170)-(A,B),PSET:CIRCLE(A,B),R,2
540 FOR N=1 TO NI:IF A(N)=-1 THEN 560
```

```
550 P=PPOINT(A(N),B(N)):IF P=2 THEN S=S+10:A(N)=-1
560 NEXT N:CIRCLE(A,B),R,1:LINE(M1(U),170)-(A,B),PRESET:GOTO 450
570 IF A(N)>30 AND A(N)<54 THEN M(1)=0:DRAW"C1;BM32,180;E10;F10":A(N)=-1:RETURN
580 IF A(N)>58 AND A(N)<82 THEN C(1)=1:DRAW"C1;BM61,180;U8;R20;D8":A(N)=-1:RETUR
N
590 IF A(N)>88 AND A(N)<112 THEN C(2)=1:DRAW"C1;BM91,180;U8;R20;D8":A(N)=-1:RETU
RN
600 IF A(N)>116 AND A(N)<141 THEN M(2)=0:DRAW"C1;BM117,180;E10;F10":A(N)=-1:RETU
RN
610 IF A(N)>143 AND A(N)<167 THEN C(3)=1:DRAW"C1;BM146,180;U8;R20;D8":A(N)=-1:RE
TURN
620 IF A(N)>174 AND A(N)<198 THEN C(4)=1:DRAW"C1;BM177,180;U8;R20;D8":A(N)=-1:RE
TURN
630 IF A(N)>199 AND A(N)<223 THEN M(3)=0:DRAW"C1;BM202,180;E10;F10":A(N)=-1:RETU
RN
635 RETURN
```

```
640 W1=0
650 FOR N=1 TO NI
660 IF A(N)=-1 THEN W1=W1+1
670 NEXT N
680 IF W1<NI THEN 280
690 PCLS:'YOU'VE GOT 'EM ALL
700 '**BONUS**
710 PLAY"V15T1003ABGBGAAGGBABG"
720 FOR N=1 TO 4:IF C(N)=0 THEN S=S+100:NEXT N
730 FOR N=1 TO 3:IF M(N)=1 THEN S=S+50:NEXT N
740 NI=NI+1
750 IF N(I)>20 THEN NI=20
760 FOR N=1 TO 2000:NEXT N
770 RESTORE:GOTO 120
780 IF S<HI THEN 840
790 CLS 1
800 PRINT"YOU HAVE ACHIEVED THE HIGH SCORE"
```

```
810 HI=S
820 PRINT:PRINT:PRINT"OF ";HI;" POINTS"
    :GOTO 890
830 FOR N=1 TO 2000:NEXT N
840 CLS 1
850 PRINT"YOUR SCORE IS ";S
860 PRINT:PRINT
870 PRINT"THE HIGH SCORE IS ";HI
880 PRINT:PRINT
890 PRINT"PRESS A KEY FOR A GAME OF"
    :PRINT"  **MISSILE COMMAND**"
900 IF INKEY$=""THEN 900 ELSE 80
```

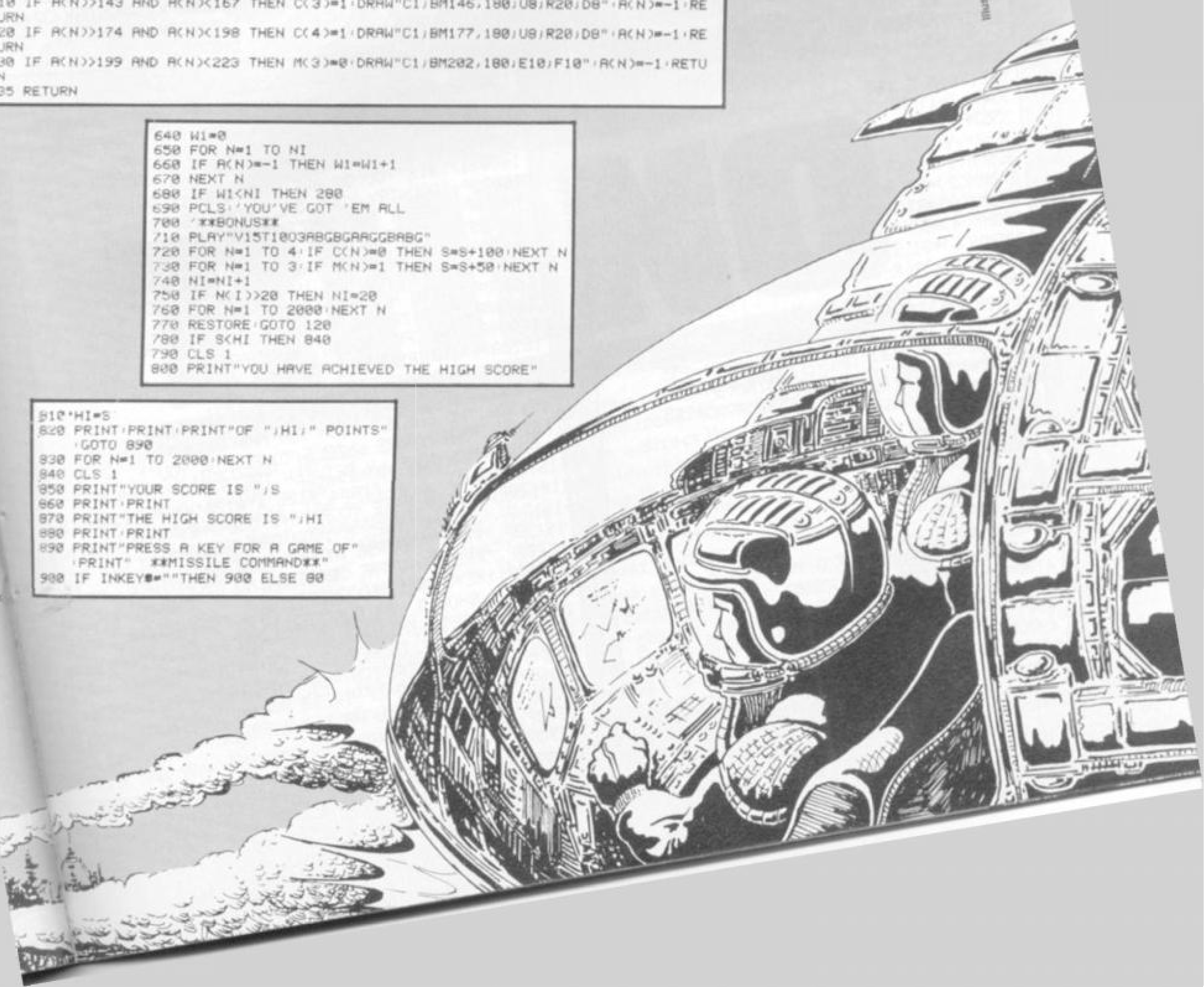


Illustration: Dorian Cross

```
1DIMMM(10),VV(10),DD(10),
T(11),RR(2),P(-1)
2P.$21
3[
4:RR1STX#80;RTS
5:RR0JSR#FFE3
6LDX@10
7:RR2CMPT,X;BEQRR1
8DEX;BPLRR2;BMIRR0
9RTS
10]
11P.$6
12$T=" ZXCASDQWE"
15S=#8000
16N=1
17GOS.i
18sIN.'"HOW MANY TREES
(1-200)",O;IFO>200;O=200
19P.$12;?#E1=0
```

```
20F.J=1TOO
30X=A.R.%480+32
35IFS?X=255;G.30
40S?X=255
50N.
60S!60=#40404040
70S!92=#40804040
80S!124=#40404040
90S!416=#40404040
100S!448=#40404040
110S!480=#4040400F
111X=480
120F.I=1TO10;VV(I)
=0;DD(I)=0;MM(I)=0;N.
121@=0
140F.I=1TON
142R=A.R.%447+32
144IFS?R=255G.142
146VV(I)=R;N.I
```

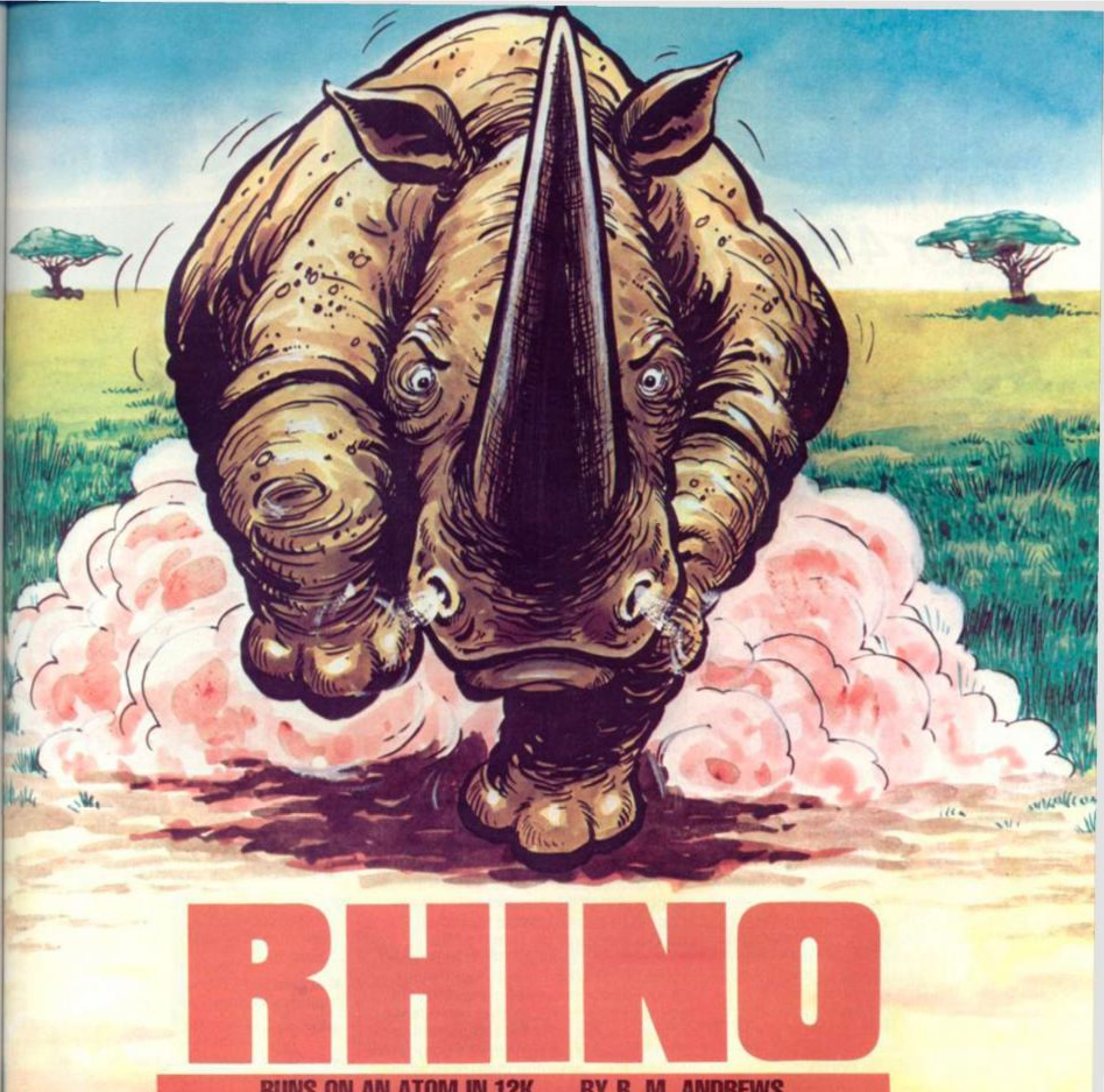
```
147IFN=1;P."THERE IS 1 RHINO";G.149
148P."THERE ARE ",N," RHINOS"
149P.$30;F.J=0TO5000;N.
150P."your",$128,"go                ",$30
152LI.RR0
154P."          ",$30
155W=?#80
160GOS.(2000+W*1000)
250S?X=15
252IFX=94;G.15000
300Q=0
305F.I=1TON
310IFDD(I)=1;G.325
315R=VV(I)
317U=R%32;V=R/32;E=X%32;G=X/32
320IFU<>E;IFV<>G;IFA.(U-E)<>A.(V-G);G.325
321K=32*SGN(G-V)+SGN(E-U)
322F.J=R TO X S.K
323IFS?J=255;J=X;N.J;G.325
324N.J;DD(I)=1;Q=1;S?R=18
325N.I
330IFQ>0;G.150
350F.I=1TON
355IFDD(I)=0;G.570
360R=VV(I)
365MM(1)=S?(R+31)
370MM(2)=S?(R+32)
375MM(3)=S?(R+33)
380MM(4)=S?(R-1)
385MM(6)=S?(R+1)
390MM(7)=S?(R-33)
395MM(8)=S?(R-32)
400MM(9)=S?(R-31)
405IFMM(4)=255;IFMM(8)=255;MM(7)=255
410IFMM(8)=255;IFMM(6)=255;MM(9)=255
415IFMM(6)=255;IFMM(2)=255;MM(3)=255
420IFMM(2)=255;IFMM(4)=255;MM(1)=255
425K=R;Y=R
430U=R%32;V=R/32;E=X%32;G=X/32
435A=A.(U-E);B=A.(V-G);Z=A*A+B*B
439L=0
440F.J=32TO-32S.-32
450F.M=-1TO1
455L=L+1
460IFMML=255ORMML=136ORMML=18;G.n
470D=R+J+M;IFA.(D%32-R%32)
     =31ORD<32ORD>511;G.n
480IFMML=15;M=1;J=-32;I=N;N.;N.;N.;G.w
490GOS.r
500nN.;N.
```

```
560S?K=32;S?Y=18;R=Y
565VV(I)=R
570N.I
600G.150
1000rU=D%32;V=D/32
1030A=A.(U-E);B=A.(V-G);C=A*A+B*B
1040IFC<Z;Z=C;Y=D
1050R.
1500wS!(X-2)=#0D010817
1510F.J=0TO5000;N.
1520P.$12
1530P."PRESS A KEY TO GO AGAIN";LI.#FFE3
1550G.s
2000P.$12,"YOU RESIGN!"'
2010P."PRESS ANY KEY TO GO AGAIN";LI.#FFE3;G.s
3000IFS?(X+31)=255;R.
3010IFX%32=0ORX/32>=15;R.
```

```
3020S?X=32;X=X+31
3030R.
4000IFS?(X+32)=255;R.
4010IFX/32>=15;R.
4020S?X=32;X=X+32
4030R.
5000IFS?(X+33)=255;R.
5010IFX%32=31ORX/32>=15;R.
5020S?X=32;X=X+33
5030R.
6000IFS?(X-1)=255;R.
6010IFX%32=0;R.
6020S?X=32;X=X-1
6030R.
7000R.
```

```
8000IFS?(X+1)=255;R.
8010IFX%32=31;R.
8020S?X=32;X=X+1
8030R.
9000IFS?(X-33)=255;R.
9010IFX%32=0ORX/32=1;R.
9020S?X=32;X=X-33
9030R.
10000IFS?(X-32)=255;R.
10010IFX/32=1;R.
10020S?X=32;X=X-32
10030R.
11000IFS?(X-31)=255;R.
11010IFX%32=31ORX/32=1;R.
11020S?X=32;X=X-31
11030R.
```

```
15000P.$12,"PHEW,MADE IT!"'
15010P."PRESS A KEY TO GO AGAIN!";LI.#FFE3
15030N=N+1;IFN>10;N=10
15040G.s
16000iP.$12"YOU(O) ARE STRANDED IN RHINO"'
16020P."COUNTRY.YOUR ONLY HOPE IS TO"'
16030P."REACH THE SANCTUARY OF A HUT(h)"'
16040P."SITUATED IN A CLEARING ON THE"'
16050P."FAR SIDE OF THE TREES("$223")."'
16060P."ONCE YOU ARE IN A DIRECT LINE"'
16070P."WITH A HIDDEN RHINO (EITHER"'
16080P."HORIZONTAL,VERTICAL OR DIAGONAL)"
16090P."AND PROVIDING THERE ARE NO"'
16100P."INTERVENING TREES,IT WILL APPEAR"
16110P."AND PROCEED TO CHASE YOU."'
16120P."FORTUNATELY,THE RHINOS CAN MOVE"'
16130P."NO FASTER THAN YOU AND,BEING"'
16140P."BULKY,ARE UNABLE TO FOLLOW YOU"'
16150P."DIAGONALLY BETWEEN TREES."'
16160P."            Press"$128"a"$128"key";LI.#FFE3
16170P.$12"TO MAKE YOUR MOVE,USE THE KEYS"'
16180P."AROUND THE 'S'.YOU CAN RESIGN"'
16190P."FROM A CHASE AT ANY TIME BY"'
16200P."PRESSING THE SPACEBAR.NO OTHER"'
16210P."KEYS ARE RECOGNISED."'
16220P." SHOULD YOU SUCCEED IN REACHING"'
16230P."SAFETY,THE NUMBER OF RHINOS"'
16240P."WILL BE INCREASED BY ONE,UP TO A"
16250P."MAXIMUM OF TEN.YOU MAY CHOOSE"'
16260P."THE NUMBER OF TREES YOU WANT."'
16270P."THE MORE YOU HAVE,THE EASIER THE"
16280P."GAME."
16290R.
```



RHINO

RUNS ON AN ATOM IN 12K BY R. M. ANDREWS

"Out here in the bush us big game hunters have to live by our wits and our trusty elephant guns. Things can get really nasty — and more often than not — they do! Did I ever tell you about the time I was trapped out in the open in Rhino country? That was a tough one I can tell you. Dozens of the brutes came running at me as I made a beeline for that old poachers hut down in the clearing. Luckily I managed to keep dodging through the trees and none of them got me. But, by jove, it was close!"

Now you can relive our hunter's exciting adventure. You are stranded in the bush and your only hope is to reach the sanctuary of a hut situated in a clearing on the far side of some trees. Once you are in a direct line with a hidden rhino, and providing there are no intervening trees the horned beast will appear and proceed to chase you.

Fortunately for you the rhinos cannot run any faster than you and being big and bulky are unable to follow you diagonally through the trees. Should you succeed in reaching the hut unmolested the number of rhinos will be increased by one — up to a maximum of 10. You may choose the number of trees you want. The more there are the easier the game.

Full instructions on how to deal with a runaway Rhino are included in the program.

Illustration: Terry Rogers

Sinclair ZX Spectr

16K or 48K RAM... full-size moving-key keyboard... colour and sound... high-resolution graphics...

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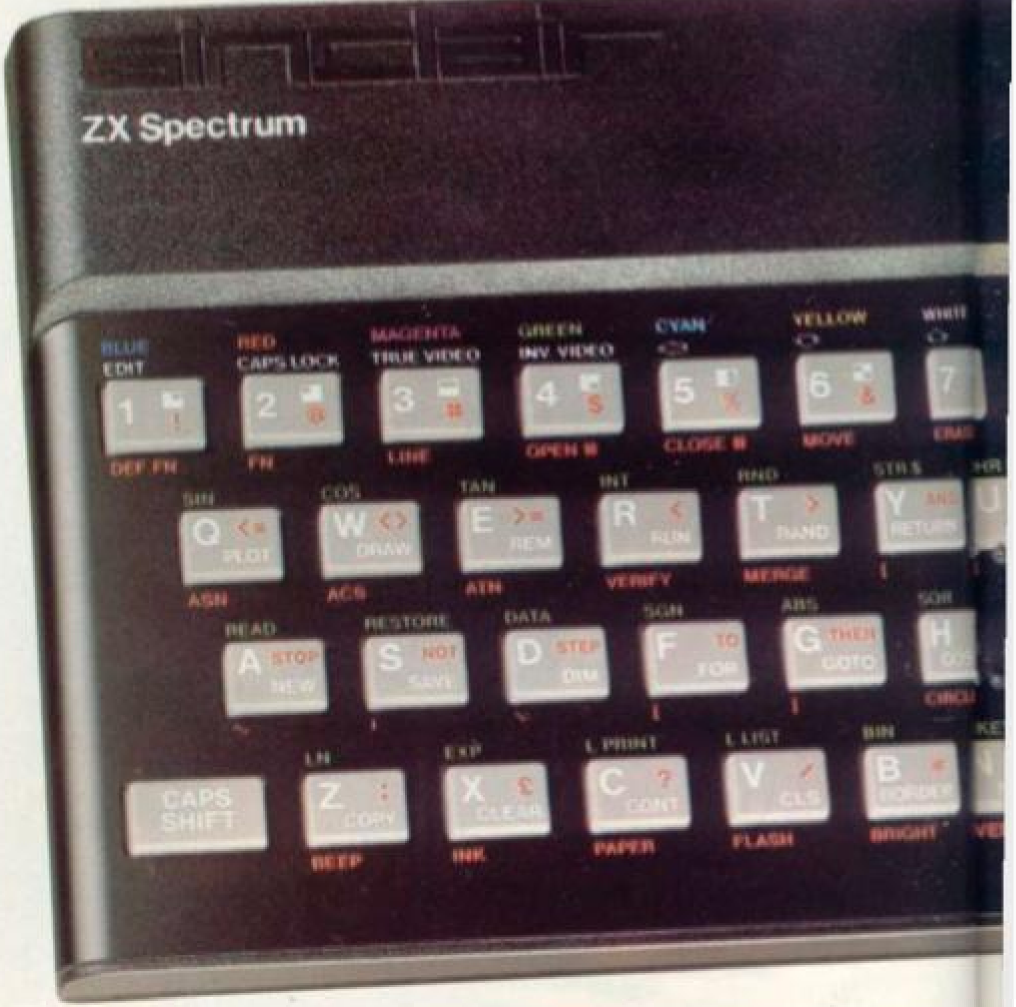

First, there was the world-beating Sinclair ZX80. The first personal computer for under £100.

Then, the ZX81. With up to 16K RAM available, and the ZX Printer. Giving more power and more flexibility. Together, they've sold over 500,000 so far, to make Sinclair world leaders in personal computing. And the ZX81 remains the ideal low-cost introduction to computing.

Now there's the ZX Spectrum! With up to 48K of RAM. A full-size moving-key keyboard. Vivid colour and sound. High-resolution graphics. And a low price that's unrivalled.

Professional power–personal computer price!

The ZX Spectrum incorporates all the proven features of the ZX81. But its new 16K BASIC ROM dramatically increases your computing power.

You have access to a range of 8 colours for foreground, background and border, together with a sound generator and high-resolution graphics.

You have the facility to support separate data files.

You have a choice of storage capacities (governed by the amount of RAM). 16K of RAM (which you can uprate later to 48K of RAM) or a massive 48K of RAM.

Yet the price of the Spectrum 16K is an amazing £125! Even the popular 48K version costs only £175!

You may decide to begin with the 16K version. If so, you can still return it later for an upgrade. The cost? Around £60.

Ready to use today, easy to expand tomorrow

Your ZX Spectrum comes with a mains adaptor and all the necessary leads to connect to most cassette recorders and TVs (colour or black and white).

Employing Sinclair BASIC (now used in over 500,000 computers worldwide) the ZX Spectrum comes complete with two manuals which together represent a detailed course in BASIC programming. Whether you're a beginner or a competent programmer, you'll find them both of immense help. Depending on your computer experience, you'll quickly be moving into the colourful world of ZX Spectrum professional-level computing.

There's no need to stop there. The ZX Printer – available now – is fully compatible with the ZX Spectrum. And later this year there will be Microdrives for massive amounts of extra on-line storage, plus an RS232 / network interface board.

Key features of the Sinclair ZX Spectrum

- Full colour – 8 colours each for foreground, background and border, plus flashing and brightness-intensity control.
- Sound – BEEP command with variable pitch and duration.
- Massive RAM – 16K or 48K.
- Full-size moving-key keyboard – all keys at normal typewriter pitch, with repeat facility on each key.
- High-resolution – 256 dots horizontally x 192 vertically, each individually addressable for true high-resolution graphics.
- ASCII character set – with upper- and lower-case characters.
- Teletext-compatible – user software can generate 40 characters per line or other settings.
- High speed LOAD & SAVE – 16K in 100 seconds via cassette, with VERIFY & MERGE for programs and separate data files.
- Sinclair 16K extended BASIC – incorporating unique 'one-touch' keyword entry, syntax check, and report codes.

rum

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DELETE
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FORMAT
CODE
PEEK
TAB
INPUT
POKE
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IN
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LEN
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ENTER
LOAD
LIST
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ZX Spectrum software on cassettes – available now

The Spectrum software library is growing every day. Subjects include games, education, and business/household management. Flight Simulation...Chess...Planetoids... History...Inventions...VU-CALC...VU-3D ...Club Record Controller...there is something for everyone. And they all make full use of the Spectrum's colour, sound, and graphics capabilities. You'll receive a detailed catalogue with your Spectrum.

ZX Expansion Module

This module incorporates the three functions of Microdrive controller, local area network, and RS232 interface. Connect it to your Spectrum and you can control up to eight Microdrives, communicate with other computers, and drive a wide range of printers.

The potential is enormous, and the module will be available in the early part of 1983 for around £30.

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Sinclair Research Ltd, Stanhope Road,
Camberley, Surrey GU15 3PS.
Tel: Camberley (0276) 685311.

The ZX Printer – available now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set – including lower-case characters and high-resolution graphics.

A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your ZX Spectrum. A roll of paper (65ft long and 4in wide) is supplied, along with full instructions. Further supplies of paper are available in packs of five rolls.

The ZX Microdrive – coming soon

The new Microdrives, designed especially for the ZX Spectrum, are set to change the face of personal computing by providing mass on-line storage.

Each Microdrive can hold up to 100K bytes using a single interchangeable storage medium.

The transfer rate is 16K bytes per second, with an average access time of 3.5 seconds. And you'll be able to connect up to 8 Microdrives to your Spectrum via the ZX Expansion Module.

A remarkable breakthrough at a remarkable price. The Microdrives will be available in the early part of 1983 for around £50.

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ZX Microdrive
5

How to order your ZX Spectrum

BY PHONE – Access, Barclaycard or Trustcard holders can call 01-200 0200 for personal attention 24 hours a day, every day. BY FREEPOST – use the no-stamp needed coupon below. You can pay by cheque, postal order, Barclaycard, Access or Trustcard.

EITHER WAY – please allow up to 28 days for delivery. And there's a 14-day money-back option, of course. We want you to be satisfied beyond doubt – and we have no doubt that you will be.

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KRAZY KONG

RUNS ON A PET IN 8K

BY TIMOTHY BOONE

Kong. Now there's a name to conjour with. And that's just what we've done. At least one of our readers has, and has come up with a version of the famous arcade game.

Tim says his game is a very close copy of the arcade game's fourth screen — the most difficult and popular.

If you have not played the arcade version before then you'll need an introduction to our gorilla friend. The basic idea is that Kong has captured the beautiful heroine and taken her to the top of the Empire State Building.

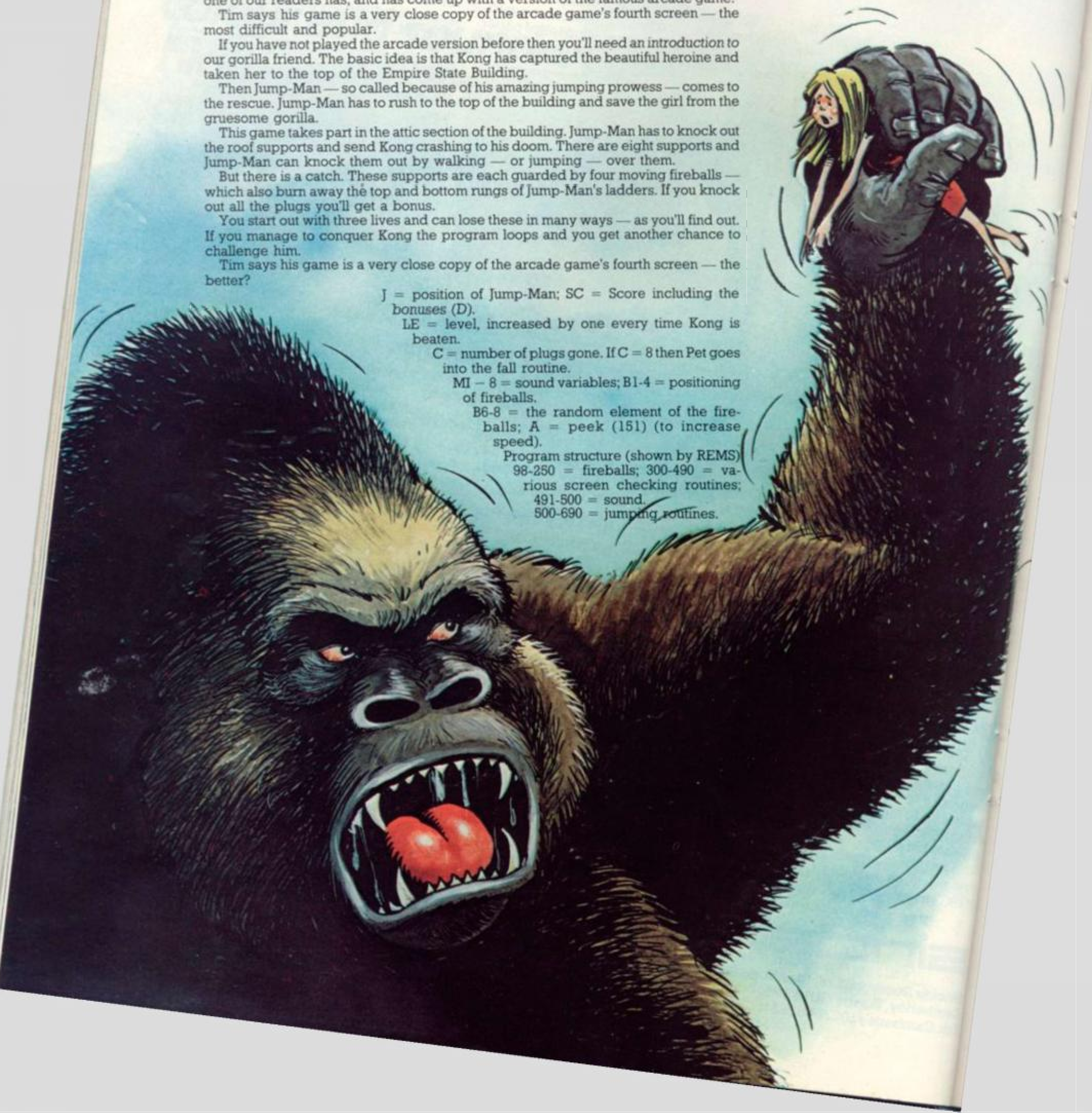
Then Jump-Man — so called because of his amazing jumping prowess — comes to the rescue. Jump-Man has to rush to the top of the building and save the girl from the gruesome gorilla.

This game takes part in the attic section of the building. Jump-Man has to knock out the roof supports and send Kong crashing to his doom. There are eight supports and Jump-Man can knock them out by walking — or jumping — over them.

But there is a catch. These supports are each guarded by four moving fireballs — which also burn away the top and bottom rungs of Jump-Man's ladders. If you knock out all the plugs you'll get a bonus.

You start out with three lives and can lose these in many ways — as you'll find out. If you manage to conquer Kong the program loops and you get another chance to challenge him.

Tim says his game is a very close copy of the arcade game's fourth screen — the better?



J = position of Jump-Man; SC = Score including the bonuses (D).
LE = level, increased by one every time Kong is beaten.
C = number of plugs gone. If C = 8 then Pet goes into the fall routine.
MI – 8 = sound variables; B1-4 = positioning of fireballs.
B6-8 = the random element of the fireballs; A = peek (151) (to increase speed).

Program structure (shown by REMS)
98-250 = fireballs; 300-490 = various screen checking routines;
491-500 = sound.
500-690 = jumping routines.

Illustration: Terry Rogers

```
10 JM=3:SC=0:LE=1
20 K=41:P=40:H=39:U=102:O=151:S=42:L=32
30 M7=59467:M8=59466:M=83:B=81
35 M1=59467:M2=59466:M3=59464:N=250
50 GOSUB4000
60 B1=32897:B2=33119:B3=33297:B4=33510
61 U=102:C=0
70 D=5000:J=33667
80 GOSUB2000
90 GOTO800
98 REM**FIREBALLS!**
100 B5=INT(RND(0)*3):B6=INT(RND(0)*3)
110 B7=INT(RND(0)*3):B8=INT(RND(0)*3)
120 IFB5>1THENB5=-1
130 IFB6>1THENB6=-1
140 IFB7>1THENB7=-1
150 IFB8>1THENB8=-1
160 B1=B1+B5:B2=B2+B6:B3=B3+B7:B4=B4+B8
170 POKEB1-B5,L:POKEB1+B5,S:B1=B1+B5
180 IFPEEK(B1+P)=LTHENPOKEB1,L:B1=B1-B5*2:POKEB1,S
190 POKEB2-B6,L:POKEB2+B6,S:B2=B2+B6
200 IFPEEK(B2+P)=LTHENPOKEB2,L:B2=B2-B6*2:POKEB2,S
210 POKEB3-B7,L:POKEB3+B7,S:B3=B3+B7
220 IFPEEK(B3+P)=LTHENPOKEB3,L:B3=B3-B7*2:POKEB3,S
230 POKEB4-B8,L:POKEB4+B8,S:B4=B4+B8
240 IFPEEK(B4+P)=8THENPOKEB4,L:B4=B4-B8*2:POKEB4,S
250 RETURN
300 REM**WALKING PLUG CHECKS**
310 IFPEEK(J+K)=UTHENPOKEJ+K,L:GOSUB396:C=C+1:SC=SC+100
320 GOSUB380
330 RETURN
340 RETURN
350 IFPEEK(J+H)=UTHENPOKEJ+H,L:GOSUB396:C=C+1:SC=SC+100
360 GOSUB380
370 RETURN
380 IFC>7THEN1500
390 RETURN
392 REM**CLIMB SOUND**
394 POKEM7,16:POKEM8,37:POKEM7,0:RETURN
396 POKEM7,16:POKEM8,15:POKEM7,0:RETURN
400 REM**>LADDER CHECKS>**
410 IFPEEK(J-K)=8THENPOKEJ-1,8
420 IFPEEK(J-B)=8THENPOKEJ-K,8:RETURN
430 RETURN
440 REM**<LADDER CHECKS<**
450 IFPEEK(J+B)=8THENPOKEJ+K,8
460 RETURN
470 IFPEEK(J-H)=8THENPOKEJ+1,8
480 IFPEEK(J-79)=8THENPOKEJ-H,8
490 RETURN
491 REM**JUMP SOUND**
492 POKEM1,16:POKEM2,37
493 FORR1=1TO3
494 FORT=1TO200STEP15
495 POKEM3,N-T
496 NEXTT
497 NEXTR1
498 POKEM1,0
499 RETURN
500 REM**>JUMP>**
510 J=J-H:POKEJ+H,L:POKEJ,M:J=J+1:POKEJ-1,L:GOSUB410:POKEJ,M
```

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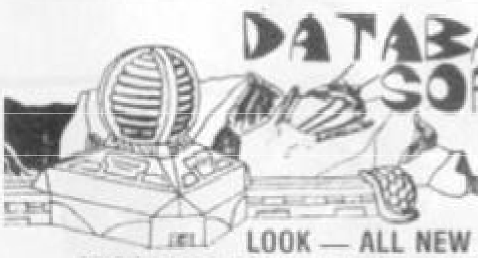

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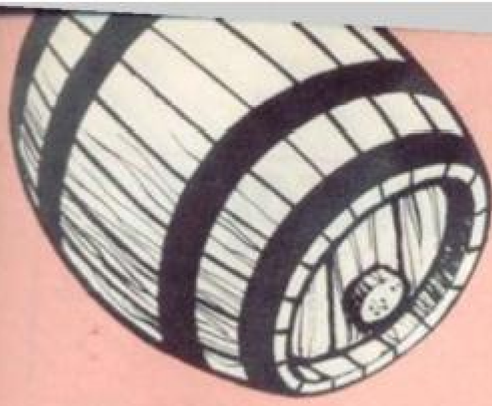
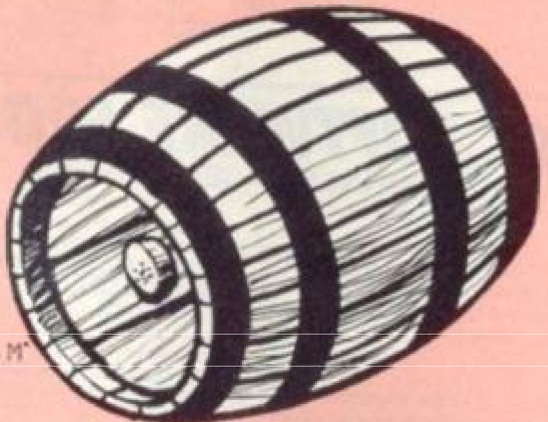
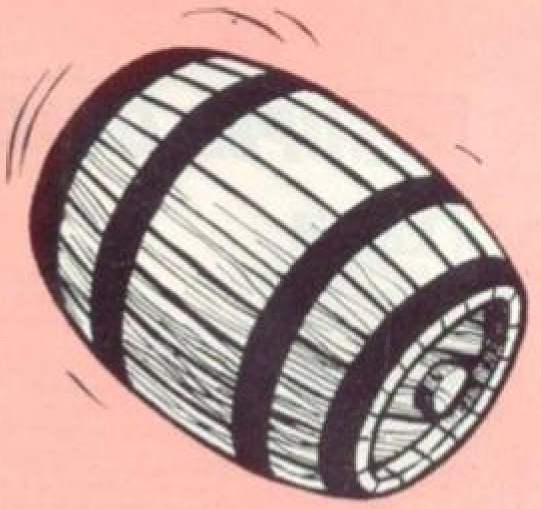
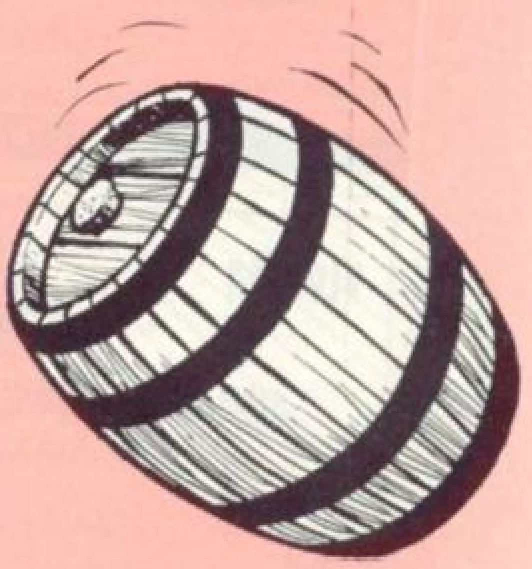




```
520 J=J+K:POKEJ-K,L:GOSUB420:POKEJ,M
530 GOSUB492
540 REM**>JUMPING PLUG CHECKS>**
545 IFPEEK(J+P)=LTHENGOSUB1250
550 IFPEEK(J+36)=UTHENPOKEJ+36,L:C=C+1:SC=SC+100
560 IFPEEK(J+37)=UTHENPOKEJ+37,L:C=C+1:SC=SC+100
570 IFPEEK(J+38)=UTHENPOKEJ+38,L:C=C+1:SC=SC+100
580 IFPEEK(J+H)=UTHENPOKEJ+H,L:C=C+1:SC=SC+100
590 RETURN
600 REM**<JUMP<**
610 J=J-K:POKEJ+K,L:POKEJ,M:J=J-1:POKEJ+1,L:GOSUB470:POKEJ,M
620 J=J+H:POKEJ-H,L:GOSUB480:POKEJ,M
630 GOSUB492
640 REM**<JUMPING PLUG CHECKS<**
645 IFPEEK(J+P)=LTHENGOSUB1250
650 IFPEEK(J+44)=UTHENPOKEJ+44,L:C=C+1:SC=SC+100
660 IFPEEK(J+43)=UTHENPOKEJ+43,L:C=C+1:SC=SC+100
670 IFPEEK(J+42)=UTHENPOKEJ+42,L:C=C+1:SC=SC+100
680 IFPEEK(J+K)=UTHENPOKEJ+K,L:C=C+1:SC=SC+100
690 RETURN
800 REM***SCENERY***
810 PRINT"J"
820 PRINT:PRINT
830 PRINT"      H     H              H     H"
840 PRINT"      H───▒─H──────────────H─▒───H"
850 FORX=1TO3:PRINT"      H     H              H     H":NEXTX
860 PRINT"    H H     H      H       H     H H"
870 PRINT"    H─────▒────────H─────────▒─────H"
880 FORX=1TO3:PRINT"    H              H               H":NEXTX
890 PRINT"  H H       H      H       H       H H"
900 PRINT"  H───────▒─H──────────────H─▒───────H"
910 FORX=1TO3:PRINT"  H         H              H         H":NEXTX
920 PRINT"H H         H      H       H         H H"
930 PRINT"H─────────▒────────H─────────▒─────────H"
940 FORX=1TO3:PRINT"H                  H                   H":NEXT
950 PRINT"────────────────────────────────────────"
990 POKEJ,M
992 PRINT"▒N"
995 Z$="●"
996 FORO=JMTO1STEP-1:PRINTZ$;:NEXTO
1000 REM**MOVEMENT-MAIN PROG**
1010 A=PEEK(0)
1020 IFA=STHENJ=J-1:POKEJ+1,L:GOSUB310:POKEJ,M
1030 IFA=KTHENJ=J+1:POKEJ-1,L:GOSUB350:POKEJ,M
1040 REM**CLIMBING**
1050 IFA=50THENIFPEEK(J-P)=8THENJ=J-P:POKEJ+P,8:GOSUB394:POKEJ,M
1055 A1=PEEK(J+P)
1060 IFA=18ANDA1=8THENJ=J+P:POKEJ-P,8:GOSUB396:POKEJ,M
1070 REM**JUMP**
1080 IFA=12THENGOSUB500
1085 REM**PLUG CHECK**
1090 IFA=5THENGOSUB600
1100 REM**REPLACING LADDER (WALK)**
1110 IFPEEK(J-K)=8ORPEEK(J+H)=8THENPOKEJ-1,8
1120 IFPEEK(J-H)=8ORPEEK(J+K)=8THENPOKEJ+1,8
1130 REM**DEATH CHECK**
1140 IFA1=LTHENGOSUB1250
1150 REM**FIREBALLS MOVE**
1160 GOSUB100
1170 REM**BONUS & SCORE**
1180 D=D-10
1190 PRINT"▒BONUS:";D;"▌   SCORE:";SC;"▌   LEVEL:";LE;"▌   "
1200 IFD=0THENPOKEJ,0:GOSUB396:FORW=1TO3000:NEXT:GOTO1400
1210 REM**F/BALL KILL CHECK**
1220 IFPEEK(J+1)=SORPEEK(J-1)=SORPEEK(J)=STHENPOKEJ,0:GOSUB396:GOTO1300
1230 IFPEEK(J-P)=SORA1=LTHENPOKEJ,0:GOSUB396:GOTO1300
1240 GOTO1010
1250 REM**FALL AND DEATH THROUGH HOLE**
1260 FORV=1TO20
1270 J=J+P:POKEJ-P,L:POKEJ,M:IFPEEK(J+P)<>LTHENPOKEJ,0:GOSUB396
1300 IFPEEK(J)=0THENFORU=1TO3000:NEXT:GOTO1400
1310 NEXTV
1400 REM**MEN CHECK & APPROP ACTION**
1410 JM=JM-1
1415 IFJM>0THENGOTO60
1420 PRINT"▒▒▒▒▒▒▒▒▒▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▒GAME OVER"
1430 PRINT"▒▒▒▒▒▒▒▒▒▶▶▶▶▶▶▶▶▶▶▒ANOTHER GAME? (Y/N)"
```

↩



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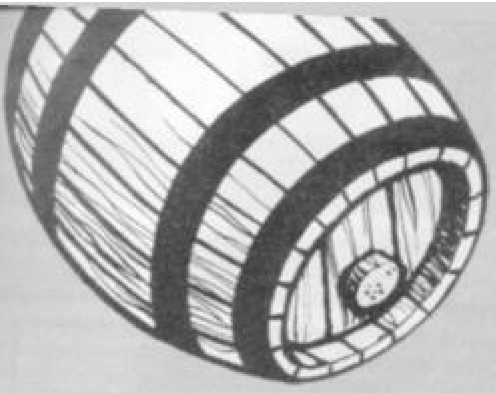
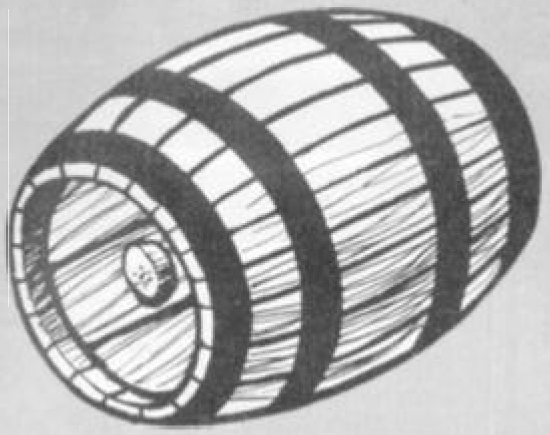
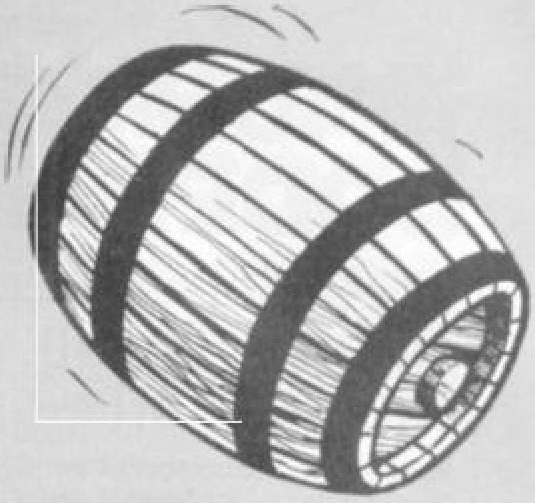
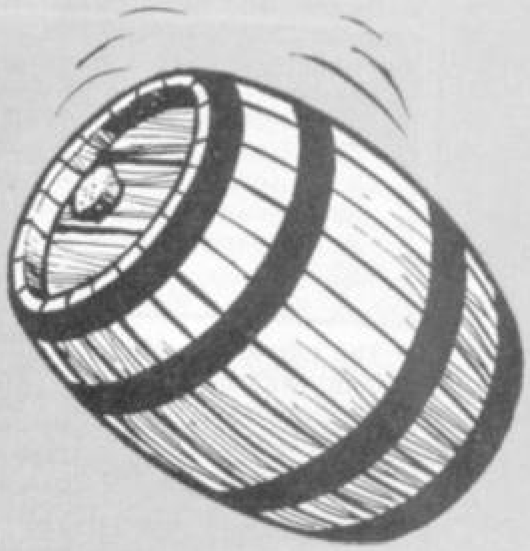






```
1440 GETT$
1450 IFT$="Y"THENRUN
1460 IFT$="N"THENPRINT"♥":END
1461 GOTO1440
1470 SC=SC+D:GOTO60
1500 REM**RAFTERS FALL!**
1510 PRINT"♥":FORF=1TO23
1520 PRINT"▶▶▶▶▶▶▶▶▶▶▶                                 ":NEXTF
1530 PRINT"♥☒☒☒☒☒☒☒☒☒☒☒☒☒☒☒☒☒☒☒☒"
1540 FORG=1TO4
1550 PRINT"▶▶▶▶▶▶▶▶▶▶▶ ────────────────────────"
1560 NEXTG
1570 PRINT"              ╭───╮ ╭──────╮-KONG(RIP)"
1580 REM**CRASH SOUND**
1590 POKEM1,16:FORB=1TO255:POKEM2,B:NEXTB:POKEM3,0
1600 PRINT"♥☒☒☒☒☒▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶YOU WIN!!"
1610 GOSUB1700
1620 PRINT"☒☒▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶YOU HAVE"
1622 GOSUB1700
1623 R$="☒▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶"
1625 PRINTR$;"CONQUERED KONG."
1630 GOSUB1700
1640 PRINTR$;"ISN'T TRUE LOVE"
1642 GOSUB1700
1644 PRINTR$;"WONDERFUL?"
1646 GOSUB1700:PRINT"☒☒▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶NOW TRY AGAIN..."
1655 SC=SC+D:LE=LE+1
1660 FORW=1TO5000:NEXT
1670 GOTO60
1700 FORW=1TO2000:NEXT
1710 RETURN
2000 REM**KONG PICTURE**
2020 PRINT"♥"
2060 PRINT"☒☒▶▶▶▶▶▶▶▶▶▶▶▶HOW HIGH CAN YOU TRY?"
2066 PRINT"☒☒☒☒☒☒☒"
2070 FORY=1TOSR
2090 PRINT"             ╭─────╮
2100 PRINT"             |\   /|   ╭╮╭╮
2110 PRINT"             |O   O|   |┴┴|
2120 PRINT"             | o o |   ╰  ╯
2125 PRINT"             |  ⌒  |    | |
2130 PRINT"             ╰─────╯   / |
2140 PRINT"            ╯ \ / ╰╮/ /
2150 PRINT"          /| ⌒  ⌒ | /
2160 PRINT"         / | ╰_|●┌HELP!
2170 PRINT"         |  \ ╰─╯ / |/
2180 PRINT"          \ /───  / |  100 METRES
2190 PRINT"           \     /  |
2220 NEXTY
2222 FORPO=1TO2000:NEXTPO
2230 RETURN
4000 PRINT"♥☒▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶KRAZY KONG"
4010 PRINT"☒     BY TIM BOONE,SOUTHAMPTON"
4020 PRINT"☒☒ THE BASIC IDEA: YOU ARE ON THE FOURTH"
4030 PRINT"☒SCREEN OF THE ARCADE GAME.THAT IS,YOU"
4040 PRINT"☒ARE IN THE ATTIC.KNOCK OUT THE PLUGS"
4050 PRINT"☒BY WALKING OR JUMPING OVER THEM."
4060 PRINT"☒WHEN YOU HAVE KNOCKED OUT ALL THE PLUGS"
4070 PRINT"☒WATCH WHAT HAPPENS!"
4080 PRINT"☒ P.S. MAKE SURE THE FIREBALLS DON'T COME"
4090 PRINT"☒TOO CLOSE!"
4100 PRINT"☒☒            PRESS <SPACE>           "
4110 GETT$:IFT$=""THEN4110
4120 PRINT"♥☒☒          KEYBOARD COMMANDS:"
4130 PRINT"☒                 8=UP"
4140 PRINT"☒                 2=DOWN"
4150 PRINT"☒                 4=LEFT"
4160 PRINT"☒                 6=RIGHT"
4170 PRINT"☒                 <=JUMP LEFT"
4180 PRINT"☒                 >=JUMP RIGHT"
4190 PRINT"☒☒  YOU SCORE 100 FOR EACH PLUG REMOVED"
4200 PRINT"☒ AND WIN THE BONUS IF YOU CONQUER KONG."
4210 PRINT"☒☒☒    PRESS <SPACE> TO PLAY...         "
4220 GETT$:IFT$=""THEN4220
4230 RETURN
```



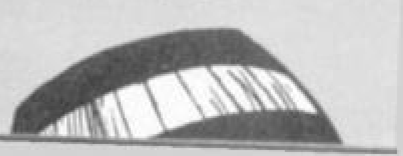


Illustration: Terry Rogers

MACHINE CODE

ARITHMETIC AND THE EIGHT-BIT . . .

Eight-bit microprocessors have a very limited range of arithmetic instructions, providing only addition and subtraction — and, in the 6809, an eight-bit by eight-bit multiplication.

Unless you are writing mathematical programs you will rarely need more than simple addition and subtraction.

Before we look at the assembly language instructions for addition and subtraction we need to look at the way arithmetic is performed on binary numbers.

An addition with decimal numbers, say 26 + 47, is carried out digit by digit: 6 + 7 = 13, which is 3 and carry 1; 1 (the carry) + 2 + 4 = 7, so the answer is 73.

We do binary addition in the same way, so the sum 26 + 47 in binary is 00011010 + 00101111, and we calculate the answer as follows:

Bit 0: 0+1=1
Bit 1: 1+1=0, carry 1
Bit 2: 1(carry) +0+1=0, carry 1
Bit 3: 1(carry) +1+1=1, carry 1
Bit 4: 1(carry) +1+0=0, carry 1
Bit 5: 1(carry) +0+1=0, carry 1
Bit 6: 1(carry) +0+0=1
Bit 7: 0+0=0

The bits are numbered in the usual fashion, with bit 0 being the rightmost (least significant) bit and bit 7 being the leftmost bit).

Thus we find the answer is 01001001, which is, of course, equal to 73 decimal.

An eight-bit binary number can represent a decimal number from 0 to 255, but the sum of two numbers, each less than 255, may be more than 255.

If we take an example, say 190 + 77, or 10111110 + 01001101 in binary, and work through the addition we find that the eight-bit answer is 00001011.

However, in this case we have a carry of 1 from bit 7, and we really need nine-bits for the correct answer 100001011, equal to 267 decimal.

If this addition is performed on an eight-bit microprocessor only eight-bits can be retained in the answer but the ninth bit will be stored in the Carry Flag in the Flags register, so after the addition 00011010 + 00101111 the carry flag would be 0, while after the addition 10111110 + 01001101 the carry flag would be 1.

The carry flag can be used in further processing.

We can now look at the assembly language instructions for performing addition.

FLYING THE FLAG WITH THE 6502

The opcode mnemonic for the addition instruction on the 6502 is ADC (ADd with Carry), which adds an eight-bit operand, the contents of the accumulator, and the carry flag, leaving the eight-bit result in the accumulator and the carry in the carry flag.

The carry flag is always included in an addition, and we have two instructions to alter the carry flag; CLC (Clear Carry) makes the carry flag 0 and SEC (SEt Carry) makes the carry flag 1.

To perform the eight-bit addition from the first example above we could write:

```
LDA #26; Get first number into accumulator
CLC; Make carry flag zero
ADC #47; Add second number to A, leaving result in A
```

We can use other addressing modes with the ADC instruction, including absolute addressing which we looked at last month, and other addressing modes we have not covered yet.

The registers in the 6502 hold eight-bits only and to add numbers larger than 255 (more than eight-bits), we have to break the addition down into eight-bit sections.

For an example of a 16-bit addition, using absolute addressing, suppose we have two 16 bit numbers, the first in memory locations 1000 & 1001 hex, the second in memory locations 1002 & 1003 hex, and we want the answer in memory locations 1004 & 1005 hex (the numbers would be stored with the low eight-bits in the first of the two memory locations).

To get the 16-bit answer we first add the low eight-bits of the two numbers and then add the high eight-bits and the carry from the low eight-bits:

```
LDA $1000; Low byte of 1st number into accumulator
CLC; Make carry flag 0
ADC $1002; Add low byte of 2nd number
STA $1004; Store low byte of answer
LDA $1001; High byte of 2nd number into accumulator
ADC $1003; Add carry and high byte of 2nd number
STA $1005; Store high byte of answer.
```

HELPING THE 6809 ADD THINGS UP

For eight-bit addition we have the opcode mnemonics ADDA and ADCA which use accumulator A, and ADDB and ADCB which use accumulator B. ADDA and ADDB add the eight-bit number specified in the operand to the appropriate accumulator, leaving the answer in that accumulator.

ADCA and ADCB add the operand, accumulator and carry flag, leaving the result in the accumulator. All these instructions leave the carry from the addition in the carry flag.

To perform the addition in the first example above we can write:

```
LDA #26; Get first number into accumulator
ADDA #47; Add second number, leaving answer in A.
```

As in the 6502 we can use other addressing modes with these addition instructions.

BY TED BALL

We also have the opcode mnemonic ADDD for 16 bit addition; this operates on the accumulator D which you will remember from last month is really another name for the two eight-bit accumulators A and B together.

Thus, to add two 16-bit numbers, the first stored in memory locations 1000 and 1001 hex, the second stored in memory locations 1002 and 1003 hex, with the answer being stored in memory locations 1004 and 1005 hex (the numbers being stored with the high byte first), we would write:

```
LDD $1000; Get first number into D
ADDD $1002; Add 2nd number, leaving answer in D
STD $1004; Store answer in memory.
```

There is no add with carry instruction for accumulator D.

Addition of numbers with more than 16-bits can be performed by breaking down the numbers into eight or 16-bit sections and adding a section at a time, using an ADD instruction for the low eight or 16-bits and an ADC instruction for subsequent eight-bit sections.

ADDRESSING YOUR Z80 CORRECTLY

For eight-bit additions we have the opcode mnemonics ADD and ADC, each of which can be used in three addressing modes.

The ADD instructions add the operand to the accumulator A, leaving the result in A, and the ADC instructions add the carry flag and the operand to the accumulator, leaving the result in the accumulator.

The instructions are ADD A, data; ADC A, data; ADD A, reg; ADC A, reg; ADD A, (HL); ADC A, (HL).

In the first pair the operand is included in the instruction; in the second pair the operand is the contents of one of the registers A,B,C,D,E,H,L; and in the third pair the operand is the contents of the memory location whose address is in the register pair HL.

The addition from our first example above can be performed in several ways:

```
LD A,26; Get first number into accumulator
ADD A,47; Add second number, leaving answer in A
```

or

```
LD A,26; Get first number into A
LD B,47; Get second number into B
ADD A,B; Add B to A leaving answer in A etc.
```

We also have the 16-bit addition instructions ADD HL,BC; ADC HL,BC; ADD HL,DE; ADC HL,DE; ADD HL,HL; ADC HL,HL, which add, or add with carry, a register pair to the register pair HL, leaving the answer in HL.

To add two 16-bit numbers, the first stored in memory locations 1000 hex and 1001 hex, and the second stored in memory locations 1002 hex and 1003 hex, with the answer going into memory locations 1004 and 1005 hex (the numbers being stored with the low byte first), we can write:

```
LD HL,(1000H); First number into HL
LD BC,(1002H); Second number into BC
ADD HL,BC; Add BC to HL leaving answer in HL
LD (1004H),HL; Store answer in memory.
```

To add numbers of more than 16 bits we must break up the addition into eight or 16-bit sections and perform the addition one section at a time, using an ADD instruction for the low eight or 16-bits and an ADC instruction for subsequent eight or 16-bit sections.

PAY YOUR MICRO A COMPLEMENT . . .

So far we have regarded all binary numbers as being positive, eight-bit numbers representing a decimal number from 0 to 255 and 16-bit numbers representing a decimal number from 0 to 65535.

There are several ways of representing negative numbers in binary, but the commonest, and the most useful with microprocessors is *twos complement notation*.

To get the twos complement of a binary number we change the 0s to 1s and the 1s to 0s and add 1 to the result.

For example, to find the twos complement of 10110111 we first change 0s to 1s and 1s to 0s, giving 01001000, then add 1, giving 01001001.

If we add an eight-bit number to its twos complement we always find that the answer is 00000000, with a carry of 1, so the twos complement can be regarded as the negative of the number. Thus we have:

−1=twos complement of 00000001=11111111

−2=twos complement of 00000010=11111110

The easiest way of performing a binary subtraction by hand is to add the twos complement, so, for example 1-2 becomes 1 + (−2), or 00000001 + 11111110 which gives an eight-bit answer of 11111111. This is the number we get when we work out the twos complement form of −1.

In twos complement notation an eight-bit binary number represents a number between −128 decimal (10000000 binary) and +127 decimal (01111111 binary). Note that in the twos complement notation the high order bit of a negative number is 1 and the high order of a positive number is 0.

The subtraction instructions in the eight-bit microprocessors treat binary numbers as having the twos complement form, so, for example 10 −5 would give the binary result 00000101 and 5 −10 would give the binary result 11111011.

In the addition of binary numbers we that when the binary numbers were regarded as representing positive numbers in the range 0 to 255 the result of an addition could be more than 255, in which case the answer was a number less than 255 but the carry flag was set to 1 by the addition.

We have a similar situation with addition and subtraction of twos complement binary numbers.

If the result of the decimal calculation with numbers in the range −128 to +127 comes outside that range the eight-bit answer produced by the processor must of course be treated as a number between −128 and +127, but the **Overflow Flag** (called V in the 6502 and 6809, and O or P/O in the Z80) is set to 1.

The assembly language instructions for subtraction are similar to the addition instructions, with SUB instead of ADD and SBC instead of ADC, but there are differences between the three processors in the way the carry is handled in the SBC instructions.

The 6809 and Z80 have eight and 16-bit SUB and SBC instructions which can be used in exactly the same way as the ADD and ADC instructions. The 6502, however, has only SBC instructions, and we need to look at this separately.

The SBC instruction performs the calculation

Accumulator — operand — complement of carry

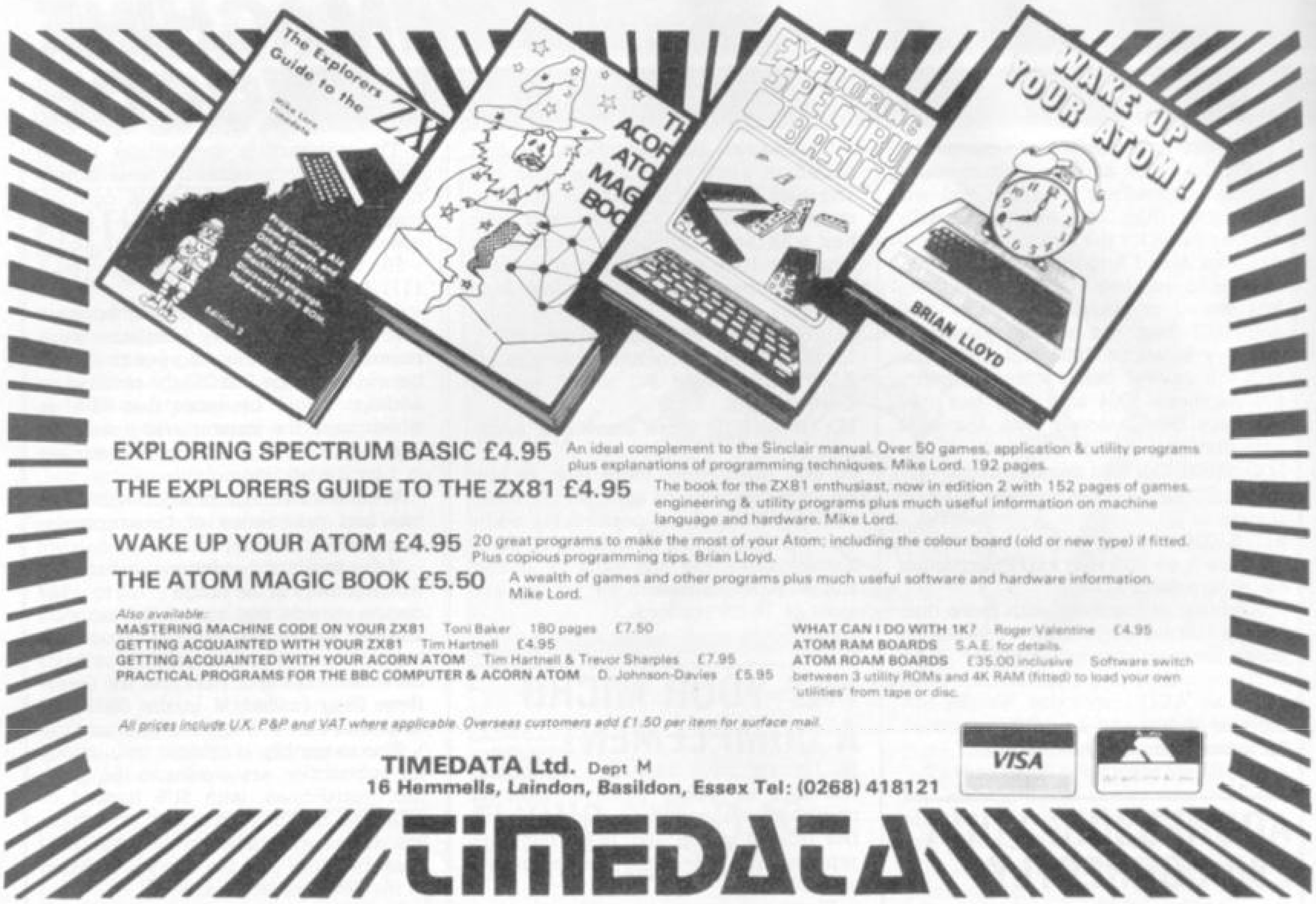
so if the carry is 0 we get accumulator — operand −1, and if the carry is 1 we get accumulator — operand −0.

Thus, to perform a straightforward eight-bit subtraction we must set the carry flag to 1 before performing the subtraction. To subtract 5 from 10 we need to write:

```
LDA 10; Get 1st number into accumulator
SEC; Set carry to 1
SBC 5; Get answer in accumulator.
```

We can perform 16-bit (or more) subtraction in a similar way to addition. With subtraction instead of addition our previous example becomes:

```
LDA $1000; Low byte of 1st number into accumulator
SEC; Make carry flag 1
SBC $1002; Subtract low byte of 2nd number
STA $1004; Store low byte of answer
LDA $1001; High byte of 1st number into accumulator
SBC $1003; Subtract high byte of 2nd number and carry
STA $1005; Store high byte of answer.
```



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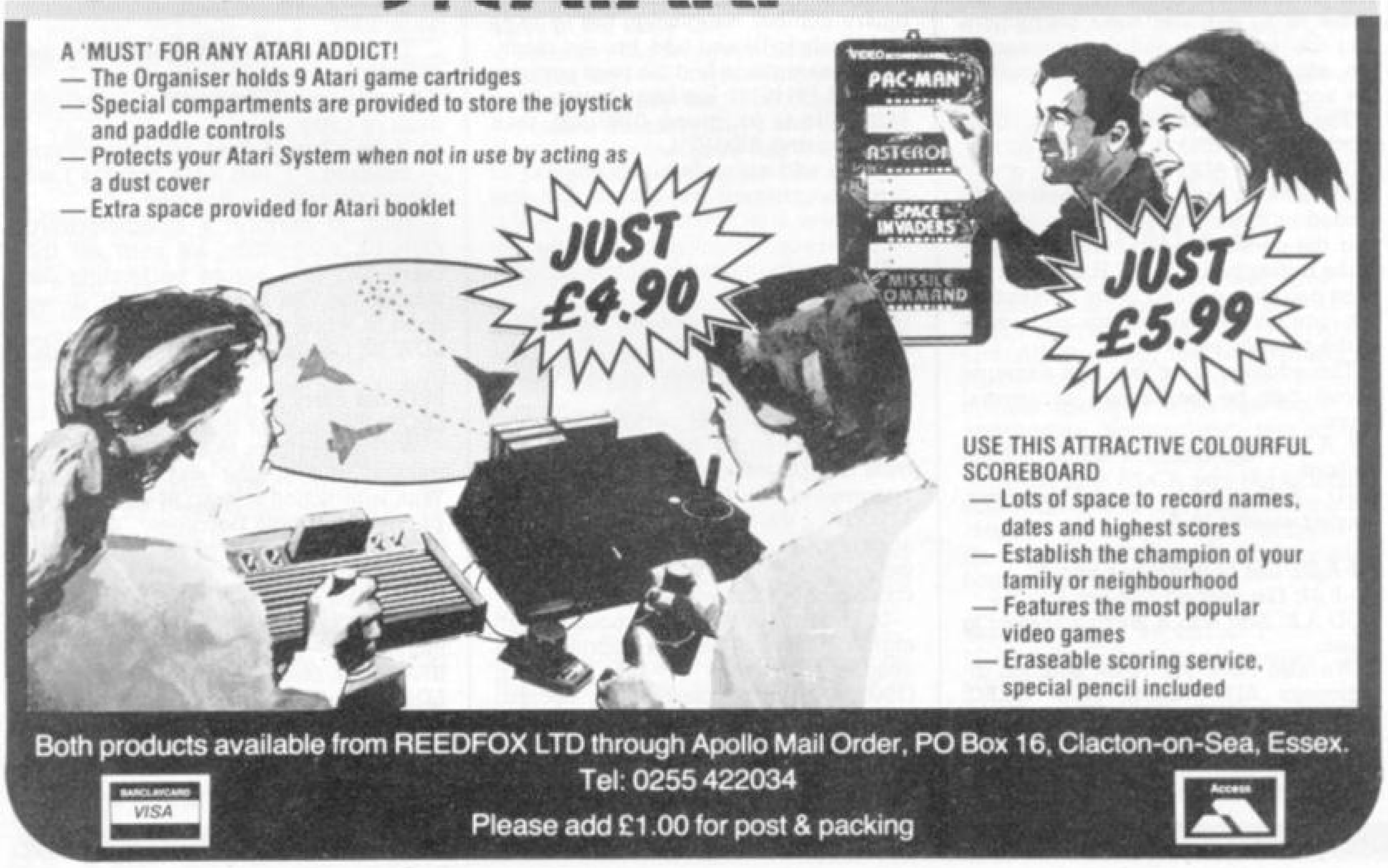

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Access

BETWEEN THE LINES . . .

The effect of hidden line removal is shown in the two accompanying illustrations of rockets. One has hidden lines removed and one does not. I hope you will agree that the drawing of the rocket with the hidden lines removed (Fig 2) appears much more solid and realistic than the other.

The methods used for removing hidden lines are quite complex and highly mathematical, but for certain special cases they can be made comparatively simple.

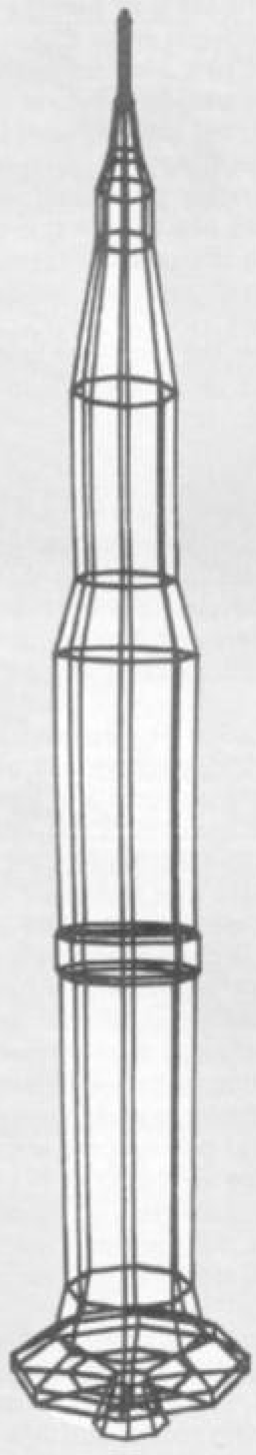

Fig 1.

A technique that helps in producing realistic images of solid objects is the removal of hidden lines from drawings of the object.

When describing a solid object, all the lines that are needed to represent its edges must be given because it may be necessary to view it from any angle.

A view of it from a specific viewpoint can be generated by using the perspective transformation. However, if the transformation is applied indiscriminately to all the lines of the object, what will be seen is a *wire-frame* representation of the object with the lines that ought to be obscured from view because they are at the back of the object displayed just as prominently as those at the front which actually are visible.

Although the *wire-frame* type of image does give a good idea of the shape of the object, it does not always convey the impression of solidarity that one might want to achieve. Besides this, it sometimes gives images that are ambiguous in the sense that they make visual sense in more than one way.

These problems can all be overcome if the lines that would be hidden from the viewer are removed.

The first point to make is that what conceals the part of an object that is hidden from view is a surface in front of it. The surface itself is surrounded by edges, all of which will be lines.

So the way to find out which are hidden from view is to determine which surfaces are masked from the observer by others, and then not to draw the lines representing the edges of hidden surfaces.

For this reason, a solid object needs to be described not simply in terms of the lines that give its edges, but also in terms of its surface facets. The lines outlining each surface facet must however be given.

To give an example, when dealing with a cube all its six surfaces would need to be given (those at the front, back, left, right, top and bottom). Each would be described by the four lines that surround the square surface facets.

One fairly simple way to remove the hidden lines is to draw each surface as a filled-in area starting from the back (that is, with the surfaces furthest from the observer), and working forwards.

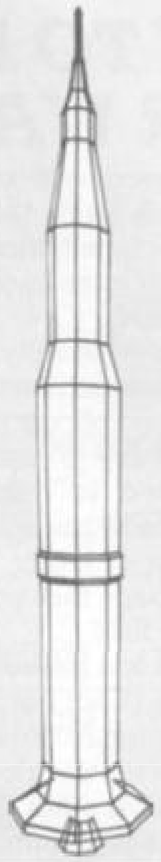

Fig 2.

In this way plotting the nearer surfaces will automatically cause them to overlay the ones that are further away, thus removing the parts that ought to be obscured.

A second method starts by plotting the points on the object nearest to the observer. It proceeds by examining the points that are further away, but along each line of sight from the observer to the object a region of visibility is maintained by continually updating the upper and lower horizons between which visibility is blocked by the parts already drawn.

Naturally the points that are found to be masked from view are not drawn, thereby removing the hidden parts. Only lines outside the marked region are drawn.

The only place that I have seen a comparitively simple program based on the last method and written in Basic is in *Practical programs for the BBC Computer and Acorn Atom* by David Johnson-Davies (Sigma Technical Press, 1982).

This gives a program for drawing surfaces with hidden line removal. For purposes of comparison, a program for drawing the surface without removing the hidden parts is also given there.

BY GARRY MARSHALL

Adventure

HOW TO FIND YOUR WAY . . .

BLOCK	LINE RANGE	PURPOSE
1	100/150	CLEAR string space DEFINE variable types DIMENSION arrays
2	200-250	READ DATA Assign variables
3	300-450	Check special conditions Clear screen PRINT display Await INPUT
4	500-600	Interpret INPUT
5	1000-30000	Execute plot (Verb routines)
6	40000 +	Set standard replies
7	50000 +	DATA statements

Figure 1. Line number range of each coding block

The deeper you get into writing your Adventure game the more difficult it will become to find your way around the program lines as it continues to expand.

This will be especially true if you have no printer and must catch the lines as they scroll up the screen. Another difficulty is that you may eventually need to renumber the lines to squeeze in a previously unforeseen bit of logic. Then even the line numbers that you remembered will be lost!

Of course, a line printer will make life easier, but is not essential. Having written three Adventures without one, I have developed some guidelines to make life easier.

The first rule is to number lines in increments of no less than 10. This will leave plenty of gaps for insertions, reducing the likelihood of having to renumber.

Line numbers must be planned in advance, and the whole program sprinkled liberally with remarks. Back in the May issue I summarised how blocks of code might be laid out, and figure 1 shows a suggested range of line numbers for each block.

You can see that the bulk of the program is contained in Block 5 where the routines for each verb reside. Let us look in more detail at this block, as it contains the least distinguishable code in the program.

Start the routine for each verb on an increment of 1000, and then in 10's for each verb. Since each verb routine will be accessed by an ON K1 GOTO statement (K1 being the decode number for the verb) it is useful to precede each of these with a REM.

But wait! One of your last tasks on completion of the program will be to remove the REMs for three reasons; to save memory, speed execution, and to remove clues for would-be cheats! If the REMs are written on the lines pointed to by the ON K1 GOTO line numbers, undefined line errors will be the order of the day when they're deleted.

So place them on the line immediately preceding the start of each routine. Thus REMs for Block 5 would appear on lines 999, 1999, 2999 etc.

When they're gone, the running of the program will not be affected. As a bonus, deleting them will be easier, since they will be recognised as having numbers ending with a 9.

Figure 2 shows some typical code using REMs. Note that they are surrounded by asterisks — much easier to spot when scrolling!

```
 599 REM ******** GOTO DECODED VERB ROUTINES *********
 600 ON K1 GOTO 1000, 2000, 3000 . . . ETC

 999 REM ********* TAKE *************
1000 IF IN > 6 THEN Q1$= "I'M CARRYING TOO MUCH" : GOTO 100
1010 IF P(K2) = 50 THEN Q1$ = "ALREADY GOT IT!" : GOTO 100
1020 IF P(K2) <> LN THEN Q1$ = "DON'T SEE IT HERE" : GOTO 100
1030 IF C(K2) <2 THEN Q1$= "I CAN'T —YET" : GOTO 100
1040 P(K2)=50 : IN = IN + 1 ; Q1$= "OK" ; GOTO 100
1999 REM ********* DROP *************
2000 IF P(K2) <> 50 THEN Q1$="NOT CARRYING IT" ; GOTO 100
          etc, etc. . . .
```

Figure 2. Typical code showing numbering of REMs

As a change from software, I bring you the lowdown on a book — *The Captain 80 Book of Basic Adventures.* This American publication is by Robert Liddel, and set me back just under £12.

The opening chapters explain to the newcomer what Adventure is and how to play it. Further chapters advise would-be programmers how to write Adventure (plotting rather than programming the game), and how to market it when written. There is also an "Adventure generator" which I hope to come back to at a later date.

However, the bulk of the book contains the listing of no fewer than 18 Basic Adventures, including the works of well-known authors like Scott Adams, Greg Hassett and Lance Micklus.

At this point I must make it quite clear that the listings are all in Level II Basic, a fairly standard Microsoft Basic used by TRS-80 Models I and III, and the Video Genie. A foreward to the book written by Scott Adams explains most of its peculiarities.

Each listing is preceded by some notes on the program, and all but one look readily convertible to other Basics, being free from PEEKs and POKEs. Anyone with 16k of memory, a good knowledge of their own machine's Basic, and an awareness that the TRS-80 screen has 64 × 16 characters should be able to use most of these listings. All are printed in exceptionally clear plain type rather than a photocopy of printer output, and although this made me apprehensive, I keyed in *Revenge of Balrog* by Don and Freda Boner and the only errors I came across were self-inflicted!

I can recommend it to serious Adventurers — but if you don't have a TRS-80 compatible machine, do browse it before purchasing.

It is published by 80 Northwest Publishing Inc., USA. I bought my copy from Gamer of Brighton, but imagine that other dealers could obtain a copy.

BY KEITH CAMPBELL

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VIDEOSCREEN

DANGEROUS MISSION ON PLANET X

PLANET PATROL

Spectravision's Planet Patrol is an all action scrolling space game for the Atari VCS.

Imaginative graphics and considerable playability are sure to make this game tough competition for Atari's own Defender.

The idea of the game is to rescue a pilot whose ship is drifting helplessly in space.

But at the same time your planet is being attacked by the TIAs (troublesome invading aliens) which you have to shoot down to score points.

When you have shot down the first wave of enemy ships and dodged their missiles you will be able to attack the enemy bases. But be careful to dodge the debris from the exploding missile bases as you will need to get past this to land at the space station in order to refuel for the night patrol. As you fly on the sky gets gradually darker and finally black.

The game now gets really tough as the screen is only lit by the moon and the occasional explosion of alien craft as your lasers blast deep into the night.

Also new from the SpectraVision stable this month is a pretty and compulsive grub gobbling game called Tapeworm.

You guide an ever lengthening snake around the screen eating up the pieces of food that flash up as you go.

It gets ever more difficult to control the snake and you can eat your own tail if you are not careful. Just to make things a little more difficult there are also two villains to be dealt with.

Nexar is a deep space 3D shoot out. Though not quite in the Activision Starmaster class it is none the less impressive.

Made in Hong Kong and imported from America there are six games in all in the brand new SpectraVision range.

The other titles are Gangster Alley — a sort of shooting arcade where the heads of various villains pop up for you to shoot at, Cross Force — another space game, and China Syndrome a tough race against time to stop a nuclear reactor exploding, based on the recent movie of the same name.

The games are available in this country in compatible PAL form from Pancom of Grimsby at £24.95.

LET'S CLUB TOGETHER

GAMES CLUB

If you are fed up of forking out high prices for the latest video game cartridge then this is your chance to win the entire range of Atari compatible games.

The offer comes from the Video Games Club — a new mail order firm which offers a moneyback guarantee to club members if they find they can purchase cartridges cheaper elsewhere.

To enter the competition you have to join the club. This costs £25 for life or £7.50 for one years trial membership.

New members will also receive two free puzzles worth over £8.

The first 1,000 members will then have their membership numbers fed into a computer and the lucky winner will be randomly selected.

WELCOME TO THE THIRD GENERATION

COLECOVISION

If you got an Atari VCS or Mattel Intellivision games machine for Christmas you may well be kicking yourself, or your dad, when you hear about the exciting new ColecoVision video games system.

The ColecoVision is one of the "Third Generation" of video games machines.

The video games boom was sparked off by the early bat and ball type games which were often given away free with new TV sets.

The next big breakthrough came with programmable video games such as the Atari VCS on which you could play an infinite number of games by simply purchasing a plug-in cartridge of your choice.

The so-called "Third Generation" machines — of which the ColecoVision is the first, are an upgrading and refinement of the second generation machines.

The ColecoVision has a massive 32K of Rom and 17K of Ram nestling under its black exterior. This makes it several times more powerful than all the video games machines currently on sale and also more powerful than most of the popular microcomputers as well.

Converted to gamers language this means superb detail, more moving characters than were previously possible, and greatly enhanced sound and colour.

The new machine will go on sale in the UK in the late Spring and early Summer with an impressive range of well known arcade titles. Prominent among these are Zaxxon, Donkey Kong, Gorf and Turbo.

Donkey Kong is practically identical to the Nintendo original and only the three hours play for twenty-pence merchants will be able to notice any difference . . .

Zaxxon is 90% as good as the arcade game which, for a "state of the art" 3D game is pretty good. Gorf too is very close to its arcade counterpart.

The fourth big game from the arcades to go with the new machine is the driving game Turbo. This requires a plug-in dashboard with steering wheel and a foot pedal accelerator which connects to it. The gears are changed with one of the hand controllers which also attatches to the dash.

Taking big names straight from the arcades will be deliberate policy to support the ColecoVision when the machine goes on sale. Through its parent company CBS and Ideal Toys, ColecoVision has first option on buying arcade games from some of the big American and Japanese arcade game designers.

Perhaps the most important of these add-ons is a converter which enables all existing games for the Atari VCS to be played on the new system.

The next important add on will be a computer keyboard which will turn the ColecoVision into a home computer — a pretty powerful one too as it will access 32K of Ram for user programs.

TOP SELLERS

Mattel Intellivision and Atari VCS games again dominate our top 10 video games best sellers for the month of November.

Intellivision titles come in first, third, seventh, ninth and 10th places. Dungeons and Dragons holds onto its first place spot as pre-Christmas best seller.

1 *Dungeons and Dragons* (Mattel); 2 *Defender* (Atari); 3 *B17 Bomber* (Mattel); 4 *Pacman* (Atari); 5 *Empire Strikes Back* (Parker Brothers); 6 *Star Raiders* (Atari); 7 *Lock 'n' Chase* (Mattel); 8 *Frogger* (Parker Brothers); 9 *Night Stalker* (Mattel); 10 *Sub Hunt* (Mattel).

Illustrations: Jon Davis and Terry Rogers

SUPERHERO MEETS THE SUPERBADDIE!

SPIDERMAN

Parker Video games will soon be providing some excitement at your local video games shop with personal appearances from Spiderman and Star Wars villain Darth Vadar to promote their new games for the Atari VCS.

They will also be launching the Parker Video Games Club with offers of high score T-shirts, posters and cartridge holders, plus the latest information on new releases and when and where the super-heroes will be appearing in person.

There will be plenty to think about on the new games front too with Amidar and Spiderman rocketing towards the *C&VG* top-ten Atari VCS chart.

Spiderman is challenged to a life or death race. He has to climb a sky-scraper and stop the Green Goblin exploding his super-bomb and devastating the city.

Spiderman climbs the building by shooting out his web and then winching himself up. You control the action using the joystick.

Pull the joystick down and Spiderman's web stretches enabling him to swing and kick down Green Goblin's henchmen who appear at the windows. You must be careful not to let the web swing across one of the Goblin's men. They will cut it — sending our hero crashing down to the ground.

The key to success in Spiderman is to use the web accurately and sparingly. You only have a certain amount of web strength which is displayed on the screen and which can also be supplemented by defusing the Goblin's bombs.

Also new from Parker Brothers this month is a version of the arcade game Amidar. This is a crazy-race to paint in the screen with blue boxes.

You are randomly an ape and a paint roller and are pursued by pigs and tribesmen. Quick reactions and a systematic approach are the keys to success in Amidar.

Parker Brothers have fifteen new Atari games planned for 1983, with Intellivision and Phillips versions promised for next July.

Next out will be a second Star Wars title called Jedi Arena and another game straight from the arcades. Super Cobra, the all action helicopter shoot-out, needs no introduction to Arcadesters.

Parker Video games are available from most good Atari stockists at £29.95.

ANYONE LOST AN ARK?

RAIDERS

Ever wished you were Indiana Jones, the swashbuckling hero of Raiders of the Lost Ark? Then this is your chance to share some of the action as you join the search for the fabled Lost Ark of the Covenant.

In this new game for the Atari VCS you must find the Ark which is hidden in the Valley of Poison, located somewhere outside the Egyptian city of Cairo.

The game follows the adventure format. You move Indy around the screen searching for clues, collecting treasure, and articles such as a whip, a pistol, and flute, which you will need to overcome specific challenges during the game.

The first scene puts you down in a market place where you have to collect the equipment you will need for your journey.

The first thing to buy is a flute which protects you from the snakes, spiders, and tetse-flies that pursue you later in the game.

You will also need a grenade to break your way into one of the rooms where more clues are hidden.

The whip and the pistol enable you to kill some of the adversaries you encounter and also let you blast the walls of the dungeons should you unfortunately find your self incarcerated during the game.

You are only allowed six pieces of equipment at a time. These are all shown at the bottom of the screen and you select the one you want to use by moving the indicator dot to below the appropriate piece.

As with most adventure games you have to explore a number of rooms containing various challenges. In Raiders they are based on the film.

Once you have found your way into the enormous mesa-field you can begin the search for the Valley of Poison wherein you will find the ark.

The game is played with both joysticks. The right joystick moves Indy around the screen, cracks his whip, fires his pistol, and explodes his grenade.

The left joystick moves the indicator dot enabling you to select items of equipment.

The game will be in the shops this month retailing at £29.95.

MORE DREAMS FROM THE AMERICANS

INTELLIVISION

Intellivision owners, jealous of the wider choice of games available for the Atari VCS, will have plenty to smile about in 1983.

The big three independent American games makers have now launched cartridges for the Mattel machine.

Prize-winning Demon Attack which was the top selling videogame in America in 1982 is now available for the Intellivision.

Also new from Imagic is an undersea battle game called Atlantis, a Donkey Kong-type game called Beauty and the Beast and a game of truly breathtaking graphics entitled Micro-Surgeon.

This last is based on the science-fantasy film Fantastic Voyage in which a submarine was reduced millions of times in size and injected into the body of a top scientist.

In Micro-Surgeon you are that submarine, seeking out and repairing diseased organs.

The talented Activision team have also turned their skills into original games for the Mattel machine. Pitfall — the jungle adventure in which our hero swings across crocodile infested swamps, seeks treasure, and is chased by scorpions and other nasties can now be enjoyed on your Intellivision.

The second Activision game is Stampede. This transforms you into a cowboy on horseback, armed with a lasso with which you must round up the stray cattle.

Coleco have also joined the rush to produce software for Intellivision with versions of their four hottest titles — Donkey Kong, Gorf, Zaxxon and Turbo.

Add to the above all Mattel's own releases and the recent announcement from Parker Brothers that their titles will be available in Mattel format by next July.

It all adds up to much more choice for Intellivision owners in the New Year.

THE SEVEN

HELPING US TO HELP YOU

The Seventh Empire is a unique game and it is bound to cause some unique problems. We feel that we have done everything we can at our end to combat these problems but we will need a lot of help from the players.

Time is going to be critical as we must process the orders in time to work out the galactic map for the following issue.

To help with this we will need to be able to easily identify Seventh Empire orders in our post and single them out for processing. Please write **"Seventh Empire Orders"** on the envelope.

We will need to be able to read your orders clearly, so work them out in rough before filling in the coupon in *C&VG*, that way your order sheet will not be plagued by crossings out. And try to write clearly and neatly in block capitals, so that we cannot misunderstand your orders.

Always fill in your own code number as this is a double check on order authenticity. You will find your seven fleets starting positions and your code number on the printout sheet with your rule book. If it is missing, or if the sheet contains the wrong name and address, please ring and let us know.

Remember which of your fleets is where. Fleet 1 will be fleet 1 throughout the game and if you have jumbled your fleets the computer will not accept the moves as legal.

The order form will appear each month (see opposite) with a clear scissors mark and cut-line around it.

Please cut it out as close to the line as possible and try to avoid excessive folding.

The forms are coded by number and colour and we can only accept orders written out on forms cut from the magazine, **not** photocopies or in any other piece of paper.

At our end the game has been designed to eliminate operator error and we are confident that this has been achieved as closely as possible but certain queries and problems may crop up during play. To sort these out we are having a Seventh Empire problem hour every week.

If you have any problems or queries on the game please ring **01-278 6558** between 3pm and 5pm on Fridays. Then we will have the computer up and running and will be able to answer your queries.

Post is both the asset and the bane of play-by-mail games. An asset because it enables games enthusiasts to find other enthusiasts and play against one another. A bane because post is not 100% reliable.

A player can miss out a turn and start again next month without being affected. However, late orders are a cause of misery, especially when you check through the following month's issue and find your moves would have earned top profits. (A bit like winning the Pools after having forgot to post the coupon.)

A deadline date when your orders are needed back, is printed opposite and it is vital that you should post them back in plenty of time to make up for the vagaries of the post.

There's also the danger that you may get your orders in narrowly too late and so believe your fleets to be elsewhere, while they'll actually be lost in space.

Once the computer starts processing it takes many hours for it to come up with the new map and we cannot include late entries. So that deadline date will be final.

A LITTLE GENIUS

A Colour Genie home computer is the prize awaiting our top-scoring Seventh Empire commander.

If you can guide your space tribe to the top profits for this opening game turn of Seventh Empire, you will have earned your reward.

And any supreme space commander would be pleased to map out future galactic campaigns on such a fine piece of modern technology.

Lowe Electronics is hoping the Colour Genie will take over from its popular predecessor.

It offers 16K Ram and 16K of Basic Rom and a full-size typewriter keyboard. Eight vivid colours, high resolution graphics, three channel sound and a 40 × 24 character screen format. It also boasts four programmable function keys and a port for plug-in program cartridges and would cost you £224.50 in the shops.

So whether you want to keep your hand-in playing space invaders between stellar planning for your successful fleets, or would prefer to produce your own program on the likely number of star cruisers to visit Vepos in March, the Colour Genie will provide for hours of entertainment.

So all you need to do is work a little magic on your order sheet perhaps rub the odd lantern and, who knows, a Genie may soon materialise on your doorstep ready to do your bidding.

YOU CAN STILL ENTER

If you haven't yet entered The Seventh Empire and are tempted by what you see here. Then it's not too late to put your name down to control a space tribe in this massive stellar conflict.

You won't be able to join in this month's competition but we will include your fleets in the following month's game.

Fill in the entry form below and return it to us quickly. The deadline for players wishing to start their Seventh Empire sojourn in March's issue, is the 24th of January.

To enter The Seventh Empire only costs the price of a stamp each month and enters you into an easy-to-play tactical struggle with up to 10,000 other *Computer & Video Games* readers.

We will despatch a 16 page rulebook to you and include you in the next available game turn.

Please include me in the Seventh Empire Competition in March.
I name my tribe:
. . . .
My name is: . . . .
Address . . . .
. . . .
Telephone . . . .

SEVENTH EMPIRE MOVEMENT ORDERS

Key	ORDER	MOVEMENT MODE	CONDITIONS
S	STAY	NONE	None
M	MOVE	TRAVEL	Between empires at peace
T	TRADE	TRAVEL	Between stars of different types and empires at peace
R	RAID	ATTACK	Star of alien empire (phase 1)
R	RETURN	ATTACK	To star of original empire (phase 2)
A	ATTACK	ATTACK	Star of empire at war with original empire
J	JUMP	GATEWAY	To another gateway star
C	CARGO	GATEWAY	To another gateway star
P	PLUNDER	GATEWAY	To another gateway star

The key refers to the computer code for the order but you should write it out in full.

TH EMPIRE

A GALAXY TO CONQUER

Your seven fleets should now be ready to be despatched into the galactic fray. But first the following information will help you plan your campaign through the galaxy, represented by the Galactic Map (right).

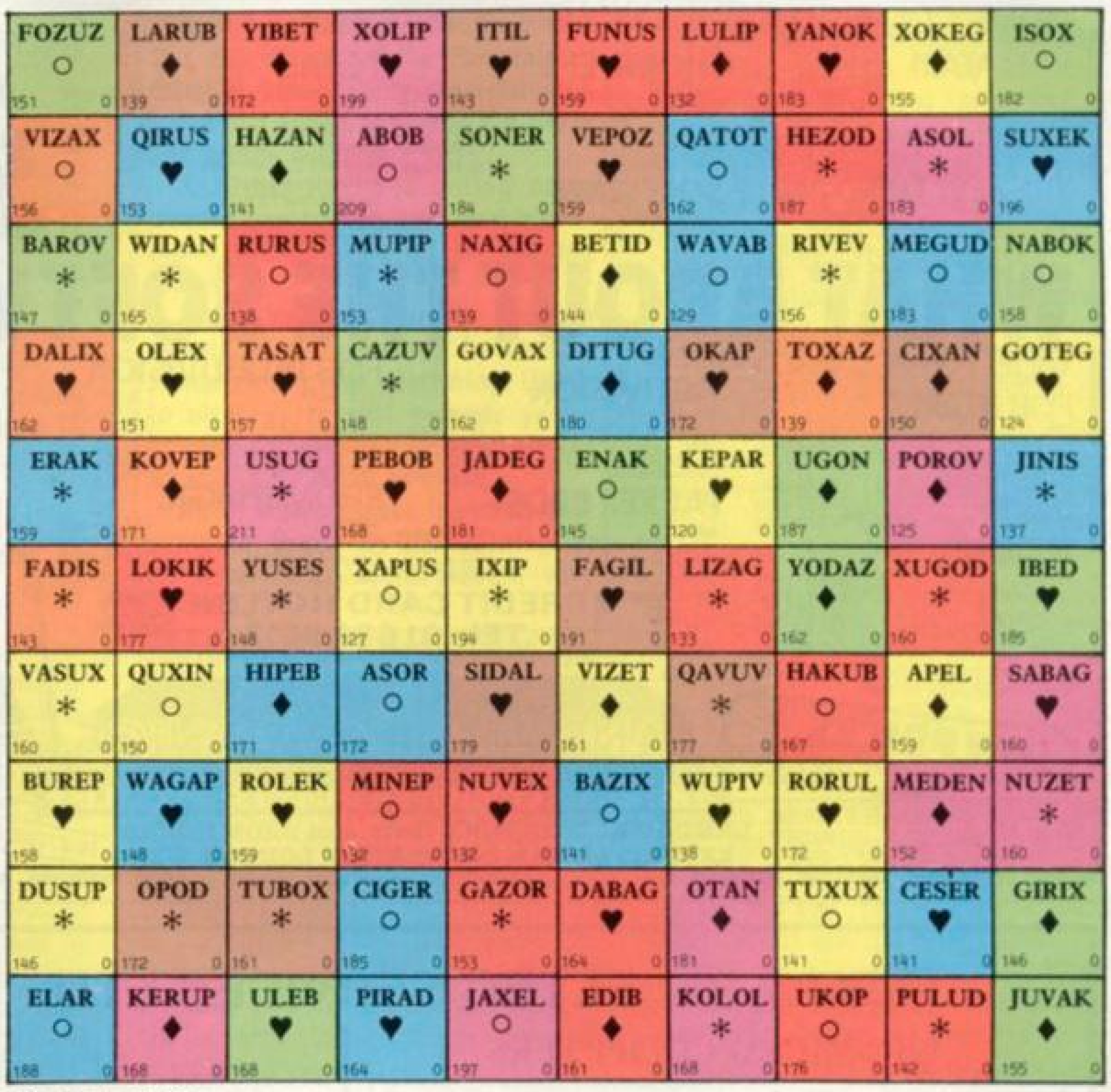
The Raid Penalty to be put into your equations for this first turn is "3".

The deadline for orders is **Monday, January 24th**, so don't wait too long before returning them.

Learn to read the Diplomatic Diagram below: a line between two empires means they are at war with one-another. So the Sun Empire can expect attacks from the Bloodline, Amethyst and Pirate Empires this turn. While the Water Empire is only at war with the Dead Empire.

The seven Imperial Ships are not currently shown on this map as no player has had a chance to lay claim to one yet.

Remember: orders can only be entered on the form below (not photo copies).



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VIZAX ○ 156 0	QIRUS ♥ 153 0	HAZAN ◆ 141 0	ABOB ○ 209 0	SONER ✻ 184 0	VEPOZ ♥ 159 0	QATOT ○ 162 0	HEZOD ✻ 187 0	ASOL ✻ 183 0	SUXEK ♥ 196 0
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VASUX ✻ 160 0	QUXIN ○ 150 0	HIPEB ◆ 171 0	ASOR ○ 172 0	SIDAL ♥ 179 0	VIZET ◆ 161 0	QAVUV ✻ 177 0	HAKUB ○ 167 0	APEL ◆ 159 0	SABAG ♥ 160 0
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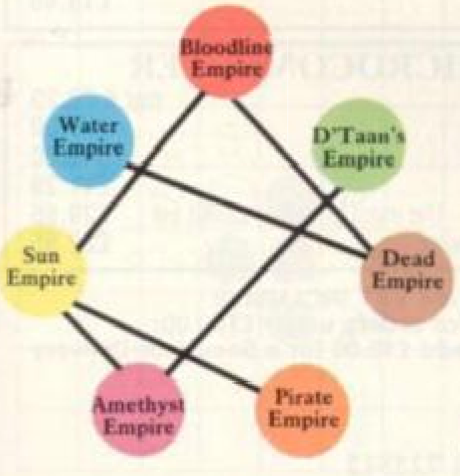
DUSUP ✻ 146 0	OPOD ✻ 172 0	TUBOX ✻ 161 0	CIGER ○ 185 0	GAZOR ✻ 153 0	DABAG ♥ 164 0	OTAN ◆ 181 0	TUXUX ○ 141 0	CESER ♥ 141 0	GIRIX ◆ 146 0
ELAR ○ 188 0	KERUP ◆ 168 0	ULEB ♥ 168 0	PIRAD ♥ 164 0	JAXEL ○ 197 0	EDIB ◆ 161 0	KOLOL ✻ 168 0	UKOP ○ 176 0	PULUD ✻ 142 0	JUVAK ◆ 155 0

The Galactic Map

	Star type	Trade value
♥	*Elixir*	*200*
◆	*Gem*	*150*
○	*Energy*	*100*
✻	*Gateway*	*50*

Star Types



The Diplomatic Diagram

Orders in Block Caps please

Name: ....

Code No: .... Telephone No: ....

	AT	1st Movement phase ACTION	1st Movement phase STAR	2nd Movement phase ACTION	2nd Movement phase STAR
FLEET 1					
FLEET 2					
FLEET 3					
FLEET 4					
FLEET 5					
FLEET 6					
FLEET 7					

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REVERSI

OPENINGS: *PAIR* EXCELLENCE

Chess has a vast store of opening theory which takes white and black into even middle game positions, built on centuries of study and documentation.

Reversi is also building up a wealth of opening theory which consist of a known sequence of moves at the start of a game and continue until one side has a large choice of good replies to choose from.

These openings usually involve filling in some, or all, of the 16 squares which make up the centre of the Reversi board.

By knowing a bit about openings, you instantly increase your chance of winning, and ensure that no-one will brow-beat you into submission early on in the game.

Unlike chess openings, Othello is young enough for openings to change according to whims of great players. So in a computer program you cannot hope to keep abreast of top moves. Better to avoid the worst blunders, then add a strong "random" factor to the rest, so that at least sometimes it plays brilliantly!

Black's first move is forced due to symmetry, so we will choose e3 as in the first diagram. White then has three choices which we have named as follows:- the "Pall" family marked "P" at f5, the "Jerbal" at d3, and the Desert at f3. Top players avoid the Jerbal, though I favour it if White is willing to play outside the centre. So tell the computer to play Desert or Pall most of the time.

The champions of the Reversi (or Othello) board study their adopted game just as thoroughly as the chess and bridge masters.

And this includes noting down classic games between rival champions and building up an opening theory.

Unlike chess where the book of openings is backed up by several centuries of chess publishing, Othello strategy is still a fairly young science and opening theories are not as stable as those in chess.

All of which makes teaching your computer to use the best openings in its first six to eight moves, very difficult.

Let's now see the general algorithms that help you avoid blunders.

The first rule is one of my basic "rules of thumb" of taking as few pieces as possible, but count the four pieces in the centre as "half" pieces. The second rule is to prefer to complete a "Pair". There are four "Pairs", each being the two adjacent squares to a centre corner, such as the centre sides at d6 and c5 marked "S".

If one square of a Pair is occupied, then the other square is attractive. It often cuts through enemy pieces, which is good play in the middle-game too.

The third rule is to mildly dislike a centre corner if its Pair is empty, to hate a centre corner if its Pair is half-occupied, and to love it if the Pair is occupied. Balance this with previous rule of thumb of course!

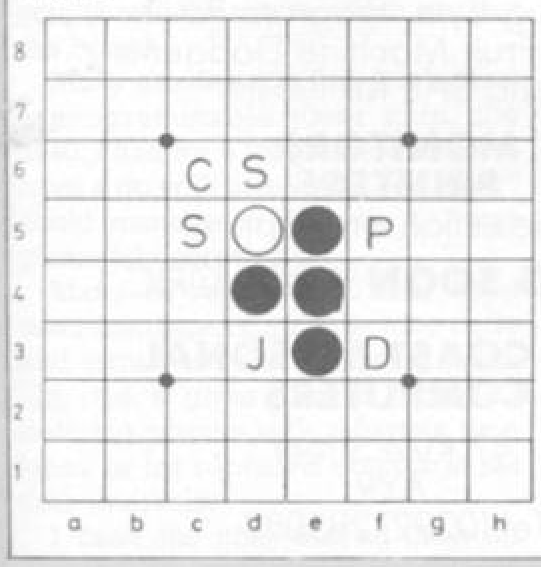
Diagram 2 shows an elegant opening which illustrates the general algorithms well. White plays the Pall at f5, to which Black completes the Pair at e6. White avoids the half-empty Centre corner at f3, so has to play d3. Black completes the Pair at c4.

White could then play at the f6 corner, but Black would reply at c3, so instead White plays d6. Black has an equal choice of Pairs to complete, selecting f4 (c5 being just as good). White takes the cheapest corner, as it is a bit early to play outside the centre. Black again has two equal moves, to complete a Pair at c5, or fill a corner at c3. Black choose c3. White Corner at f3, Black fills Pair at c5, and White completes the shape at c6, as per diagram 2. Black now has only four real choices, as four more are symmetrical, and one gives away a corner. This opening was played by John Parker in the 1981 British Championship to win the final game.

Now look at diagram 3. White played the Desert, Black filled the Pair at f4, White had no choice by symmetry, then Black again filled a Pair at e6, White then played at d3 — taking three pieces.

Why? I don't know. But Maruoka, a world champion from Japan beat many national champions with it. Where would you reply? c4? e2? g4? g5? Confused? Good, because now you know about as much on Othello openings as anyone.

Figure 1.



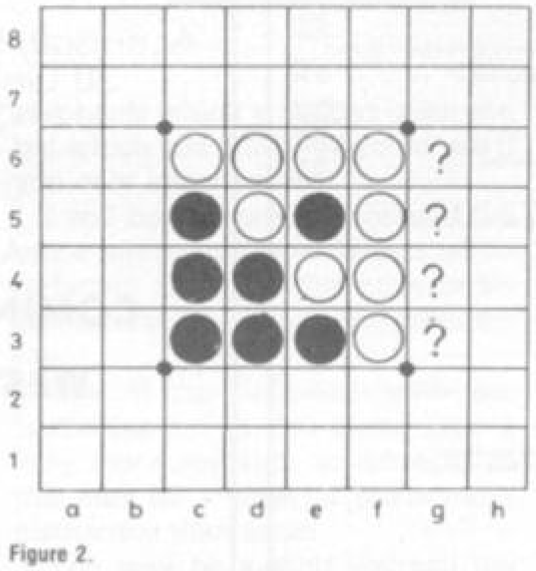
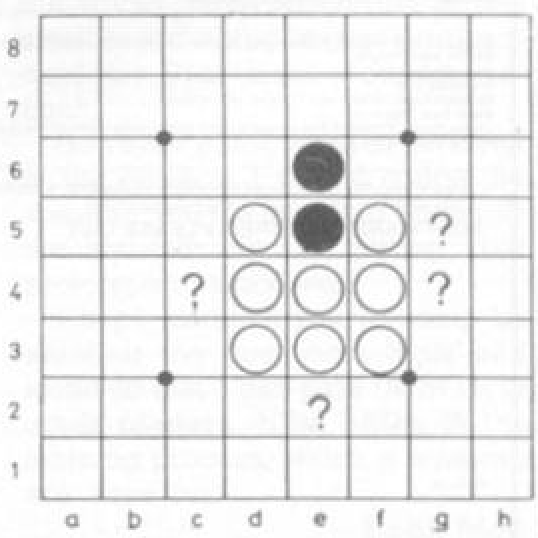


Figure 2.

Figure 3.



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Is there life after Kit Korner? The answer from this end is a definite yes. It of course depends on whether or not you are interested in developing new ideas for your computer.

Certainly the technical requirement will not be any more than for the other kits I have already covered. In fact that should be the least of your worries.

You may naturally feel that it is not worth the work involved and decide to buy in a ready built version. In some cases, though, these will not exist, and as I have always said it is far better to build your own as you will learn much faster.

Most of the first few designs I have lined up are based around a single i.c. The reason for this is that they are quite easy to adapt for various micros and are simple to put together.

Later on as I develop new ideas I cannot say what might happen. We will just have to wait and see. As a result of this new expansion there will be far more circuit diagrams and layouts than there have been in the past.

I have always believed that a circuit diagram paints at least a thousand words and is far more informative. Some of the peripheral boards will have some short routines to get you started but the major development will be up to you, as will the use to which you put the board.

Many months ago I took a look at a programmable timer chip, the 6840. I had for a long time wanted to have a go with one just to see what I could manage to do with it. I was pleasantly surprised.

Many of you may already have used interface i.c.s in machine code and fortunately this acts very much like one. It gives you the facility of defining outputs with a certain time lapse or for repeated outputs at set time intervals.

I used the chip first to flash up lights just to see if it would work. Using all three outputs I could get quite a good random flash and flash length with a little logic and some mains relays.

The 6840 is a Motorola i.c. designed for the 6800 system, but will work as well with the 6502 or, with a little help, on any eight-bit machine. It needs machine code to run it or an eight-bit output port in basic or an operator who can use machine code from Basic.

Not everyone will use the same method so I will demonstrate how it works in machine code and then leave it up to you to put the finishing touches to the program. The same goes for the other peripheral boards which I will design for you. You might even like to submit your own versions of the program for scrutiny.

The other i.c. I am interested in developing further is the priority interrupt controller, the 6828. It looks like one of those white elephants which you don't often see but which you think you could use if you only knew how.

I will be looking into some of the more interesting possibilities of interfacing to which this i.c. can be put. Interactive games controller for one.

One of the problems with this particular i.c. is that it requires a little more software to drive it, so this may be a case for some more instruction than usual.

You may be asking yourself the question, why am I picking 6800 peripheral i.c. projects rather than the more common versions, say 6502 or Z80. Certainly there are just as many i.c.s in their sets as any others.

The main reason is that I have been working for some time on 6800 systems and hopefully know a little of how they work.

Also, 6800 and 6502 peripherals are almost interchangeable. Although Z80s are very common these days for micros they are very flexible in their acceptance of other system i.c.s. This makes the use of 6800 peripherals almost ideal for the job.

If you find any others which you think could prove interesting please do not hesitate to let me know. My articles often spring from other people's ideas.

Another idea I have been working on has been the development of a dedicated microprocessor system which would be capable of fulfilling many purposes but would take very little to build.

If you imagine a basic machine and then write down its components you will only come out with a handful. Processor, ROM, RAM, I/O, display and logic circuits.

What makes a micro so expensive? Well mostly it is the bits you don't use to the full. By dedicating a micro to a particular use you are not wasting anything. Unfortunately you will not be able to use it for very much else unless you change the ROM in it which luckily is not too difficult.

As well as being relatively cheap the whole micro will go on to one small board a little larger than Eurocard size. Ever heard of miniaturisation?

However much work is involved in the projects I will of course be showing you the best and hopefully the shortest cuts to getting your prototype to work well.

I hope also that you will help by sending me your own hints and ideas so that I can pass them on to other readers. It all helps in the learning process, which is what we are here for.

Keith Mott

WARPATH PART II — BITS AND PIECES

```
90 IFK<>0THENPOKEL,K:POKEL+1,0:RETURNELSEPOKEL,256+K:POKEL+1,255:
RETURN
260 WD=WD*W2-INT(WD*W2):WN=INT(WD*R3)+1:RETURN
780 DIMH(10),PC(50,2),SV(6),VF(6),RF(6,2),X$(20),D(30),KB(1),KS(
1),KT(1),KV(1),KD(1),N(1)
800 GOSUB430:W2=997:INPUT"ENTER SCENARIO NUMBER";SC:IFSCTHENWD=S
C*.5284163ELSE800
810 GOSUB430:INPUT"HOW MANY BOULDERS";MT
821 GOSUB5200:GOTO2500    'DELETE LATER
860 RETURN
950 H(1)="ABC":H(2)="DEF":H(3)="GHI":H(4)="JKL":H(5)="MNO"
960 C5="ABCD"
970 RESTORE:FORI=1TO2:FORJ=1TO6:READK:RF(J,I)=K:K=K-256*(K<0):PO
KERW,K:RW=RW+1:NEXTJ,I
980 RESTORE:L=27544:FORI=1TO12:READK:GOSUB90:L=L+2:NEXT
990 L=27532:FORI=1TO6:READVF(I):K=VF(I):GOSUB90:L=L+2:NEXT
1000 D(2)="ABC":D(3)="DEF":D(4)="GHI":D(5)="JKL"
1010 D(7)="ABC":D(8)="DEF":D(9)="GHI":D(10)="JKL"
1020 D(12)="ABC":D(13)="DEF"
1030 D(14)="GHI":D(15)="JKL"
1040 D(17)="ABC":D(18)="DEF"
1050 D(19)="GHI":D(20)="JKL"
1060 C3="ABCD"
1070 C4="3332211113332211113332211114443211114444311115555561115
5555611555555561555555556"
1080 GT="ABCDEFGHIJKLMNOPQRSTUVWXYZA"
1090 T$="...TROOPERS":I$="INDIAN":E(0)="DEFENDER":E(1)="ATTACKER
":E(2)=" ELIMINATED":D=D(5):RETURN
1120 FORV=10TO16:POKEI,195:GOSUB440:U=I+1:P=X:GOSUB190:I=I+4:NEX
T
1130 V=16:GOSUB440:B7=X:POKEI,195:U=I+1:P=X+9:GOSUB190:I=I+3
1150 V=4:GOSUB440:B4=X:U=X+36:P=S9+1:GOSUB190
1180 DATA-24,24,48,23,-25,-48, -23,25,48,24,-24,-48,-60,60,128,6
0,-68,-128
2510 IFML>2000THENPRINTH(RND(3));
2512 IFML<1700THENPRINTH(RND(2)+3);
3099 DATA CHARACTERS
3100 DATA 158,148,094,158,148,135,171,142,148
3110 DATA 190,148,128,176,181,144
3120 DATA 184,159,175,180
3121 DATA 156,148,128,152,144,128,144,144,128,128,128,128
3122 DATA 170,140,148,170,140,148,168,184,144,160,160,128
3123 DATA 188,148,128,184,144,128,176,144,128,128,128,128
3124 DATA 176,180,144,160,180,128,160,176,128,128,128,128
3129 DATA 152,185,182,164
3130 DATA 143,143,143,143,140,140,140,140,143
3140 DATA 191,191,128,128,128,128,128,128,191
3150 DATA 191,143,140,140,140,140,140,140,188
5198 '
5199 'GRAPHIC LOADER
5200 CLS
5205 RESTORE
5206 READM$:IFM$<>"CHARACTERS"THEN5206
5210 FORI=1TO5
5220 X=PEEK(VARPTR(H(I))+2)*256+PEEK(VARPTR(H(I))+1)
5230 A$=H(I):GOSUB5400:NEXTI
5231 X=PEEK(VARPTR(C5)+2)*256+PEEK(VARPTR(C5)+1)
5232 A$=C5:GOSUB5400
5240 FORK=2TO17STEP5
5250 FORI=KTOK+3
5260 X=PEEK(VARPTR(D(I))+2)*256+PEEK(VARPTR(D(I))+1)
5270 A$=D(I):GOSUB5400:NEXTI,K
5280 X=PEEK(VARPTR(C3)+2)*256+PEEK(VARPTR(C3)+1)
5290 A$=C3:GOSUB5400
5320 X=PEEK(VARPTR(GT)+2)*256+PEEK(VARPTR(GT)+1)
5330 A$=GT
5400 FORJ=1TOLEN(A$):READM:POKE(X+J-1),M:NEXTJ:RETURN
```

WARGAMES need opposing forces, armed and ready for battle. In Warpath the conflict is between the cavalry's General plus his troopers and the three types of Indians: those armed with tomahawks, the bowmen and the horsemen.

The conflict must be carefully balanced to give both sides an equal chance of victory and this is achieved by different numbers of each piece with various movement and attack/defence advantages.

In wargames like chess, there is no problem with preserving a balance in the game as both sides are made of the same pieces in the same position.

This leads to chess experts being able to develop rigid opening formations which have been proved and used many times before.

Warpath sets out two very different looking sides which will be in a new formation each time you come to play the game.

Remember: if you have any difficulty following Warpath on your computer please write in and let us know.

By the way, the machine language is written in Z80 code. I would like to hear from anyone who successfully implements the program in 6809 or 6502 code. There are no ROM calls.

The Warpath game pieces are as follows:

		Number	Movement	Attack/ Defence
Field	Troopers	14	3	1
	General	1	4	2
	Flag	1	See below	0
Garrison	Troopers	9	3	1
Indians	Bowmen	8	3	0
	Tomahawks	8	4	0
	Horsemen	8	6	1

When the board is set up, the Flag will be in the hex occupied by the General. Any piece occupying the Flag hex will receive an extra movement factor provided that it is in that hex at the start of its move. A trooper who is adjacent to the General receives an additional attack/defence factor.

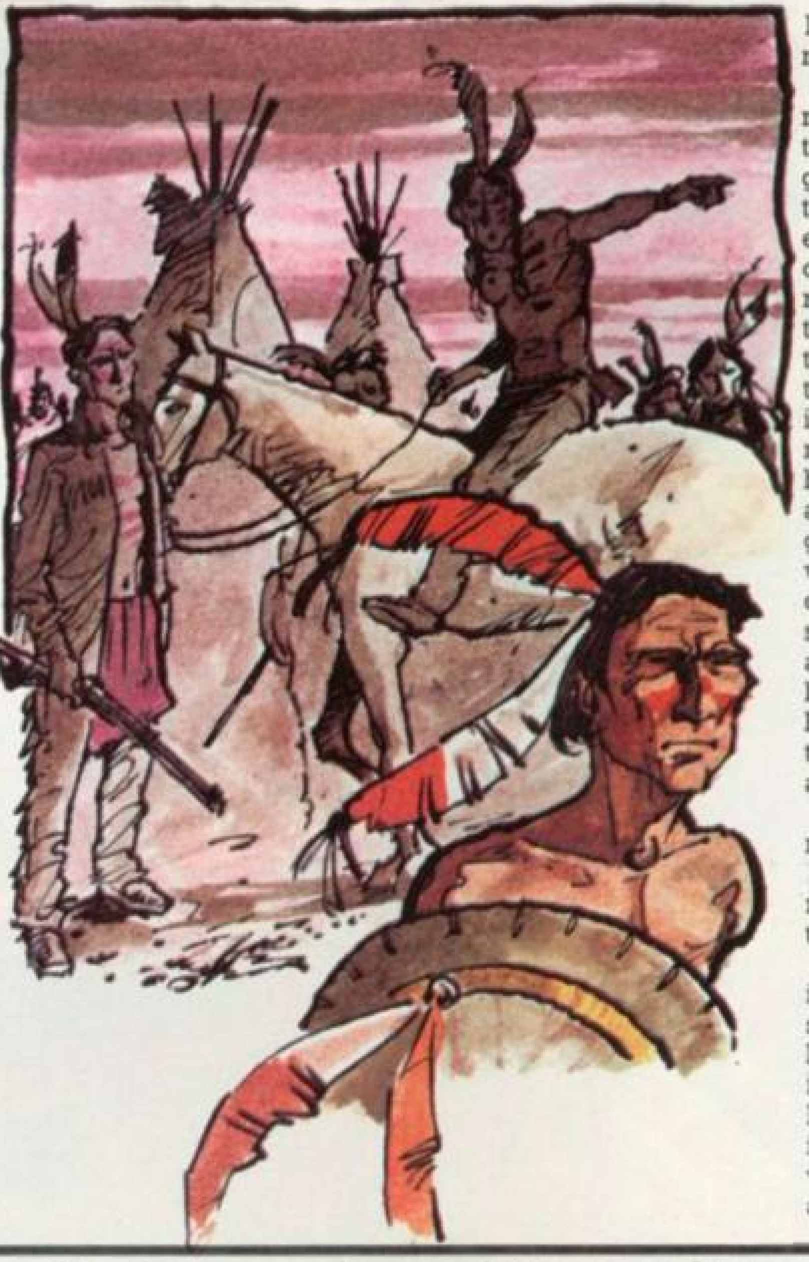
Last month we developed the BIG-SCREEN routines for WARPATH; now let's look at the creation of the pieces. The method is similar to the machine language routines but this time we build up graphic characters.

Characters can be created using the CHR$ instruction. For example: a man H(1), could be defined as:

H(1)=CHR$(158)+CHR$(148)+CHR$(094)

But this takes up 20 bytes of memory. (Count it. Remember that CHR$ only occupies one byte.) Lines 3100 to 3150 contains 98 items of DATA so if we use this method it would probably cost about 650 bytes. If we POKE the data into strings, however, it will require no more than the length of the strings defined in lines 950 to 1080 (excluding 1070), i.e. about 150 bytes — a saving of 500 bytes. It was only by adopting these methods that I was able to fit this game into 16K.

Incidentally, whilst on the subject of byte-grabbing, let us look at line 1070. This contains C4 which is a table of ODDS with 81 numbers none of which is greater than 6. I could have defined an



WARPATH

Lead the cavalry charge or plan the Indian ambush. Part II of Ron Potkin's series which combines advanced programming tips with a listing which builds into a thrilling wargame. This month, Ron looks at the pieces.

integer table and put the numbers into that, but this would have required two bytes per number and, in addition, I would have needed more DATA lines and the necessary programming to set the table up.

I estimate an extra 200 bytes would have been needed to do this, quite apart from the additional time delay. Accessing the string is done using MID$ and VAL. You should always look for these savings.

Full marks if you have seen that I could have made the table smaller by putting 3 numbers in one byte (because 6 to the power of 3 is less than 255, the capacity of one byte).

Now back to the pieces. There are several different types:

1 The men are represented by the variables H(1) to H(5).

2 Boulders are held in C3 and the Headquarters piece is held in C5.

3 A major part of the Fort is in GT.

4 D(2) to D(20) are the elimination routines and operate like a filmstrip. I find explosions very difficult to define authentically, so in these sequences I push the man into the ground!

The TRS-80 graphics are very simple. The video has 16 rows of 64 blocks and each block contains 6 pixels numbered as follows:

```
 1    2
 4    8
16   32
```

To this you must add 128. H(1) — the bowman is made up of 158 and 148, i.e.

```
 ·  2   ·   ·
 4  8   4   ·
16  ·  16   ·
```

CHR$(094) is an East pointing arrow. Many computers do not have this character — I suggest you replace this with the "Greater than" sign (ASCII 62).

Before you start typing, LOAD the program from last month. Now add the Basic listing below. This contains a graphic loader. Make sure you type lines 950 to 1080 exactly as they appear. You should also type the change in Line 821.

Make sure you save the program before running it; there are several POKE and you easily ruin it with a wrong instruction. Incidentally, always save the updated listing onto a new tape. If anything does go wrong you can always fall back on the previous month. Now type RUN and in answer to the questions, "ENTER THE SCENARIO NUMBER" and "HOW MANY BOULDERS?", type any low number — these are unimportant at present.

After all that hard work, I expect you want to see some action, but we can't do much yet. The subroutine at Line 860 includes those lines necessary to put the pieces on the map, but before we can do this I must explain two more arrays, PTABLE and IBOARD. These will be the subject of next month's article. In the meantime, lines 2510 and 2512 have been adjusted so that the men will be printed in the BIGSCREEN. This will probably create as many Generals as Troopers but it will give you an opportunity to see the results of your efforts.

Line 780 dimensions all arrays. Make sure you include even the small ones, KB, for example, only uses KB(0) and KB(1), i.e. 4 bytes. You can save about 12 bytes by using the DIM statement.

Line 790 asks for a scenario number. All my games have their own random number generator which is seeded with this number. This enables players to replay the same map layout, either because they wish to reverse sides and play under the same conditions or because they discover a particularly interesting set up. The seed, WD, is calculated from the scenario number. When a random number is needed between, say, 1 and 6, R3 is set to 6 and the generator, line 260 is called. The variable, WN, returns the random number and WD is reseeded. Note that W is defined as Double Precision. Once the board has been set up, I use the Basic random number generator to determine the outcome of attacks.

We now call the initialising routine at 1100. Lines 1100 to 1160 prepare the machine code routines by setting up the JUMP table (variable RU).

Do you find this table confusing? Some of the routines call subroutines just like GOSUB in Basic. For example, the routine in X$(1) calls X$(2). Strings, however, tend to move around in memory during program development and therefore the address of X$(2) will change. Although I can calculate this and POKE it into X$(1), I risk poking either a zero or 34 into the Basic line which would ruin the program. Instead I have created a table whose address is fixed and which can never contain 0 or 34. The address of X$(2) is poked into this together with a JUMP instruction. This enables X$(1) to call the table which in turn jumps to X$(2).

The problems with zero and 34 occur with the TRS-80 using Microsoft Basic. Zero is used to signify to the interpreter the end of a Basic line and 34 is the quote character signifying the end of a string. Other computers using different interpreters may vary. On the ZX81 the number to avoid is 76.

I have created variables which are entry addresses to the USR routines, i.e.

B1 — X$(1) address for BIGSCREEN.
B4 — X$(4) address for SEARCH.
B7 — X$(16) address for RANGE.

X$(3) is the CLEAR routine. It is used in Line 1160 only. Next month we will examine PTABLE and IBOARD.

Illustration: Jon Davis

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Panic, musn't panic, but they won't stop, twirling and spinning and turning, always turning, towards me, against me, at me.
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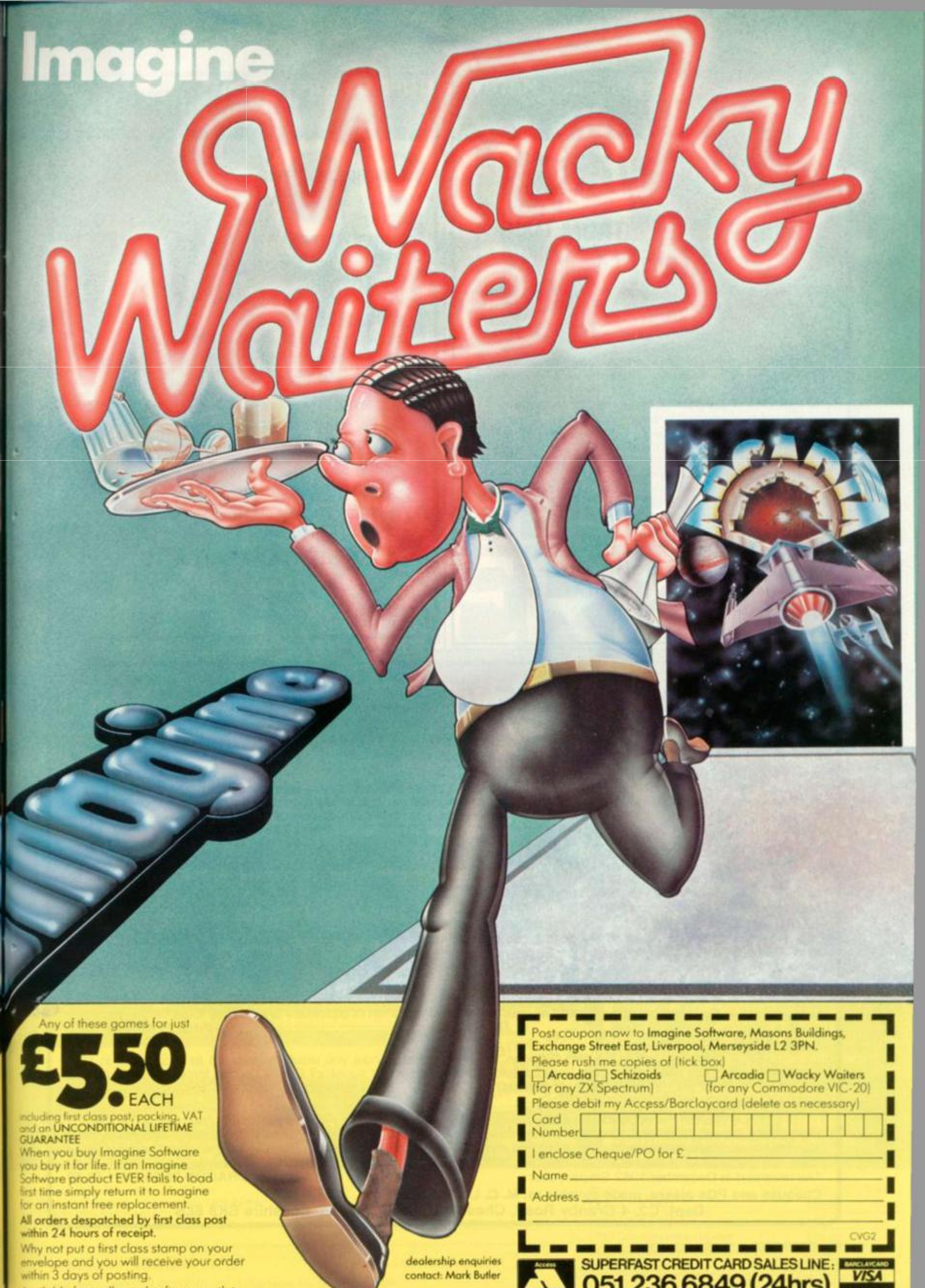

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*As reviewed in December 1982 Sinclair User. **Price: DRAGON £6.95 ZX81 £4.50**

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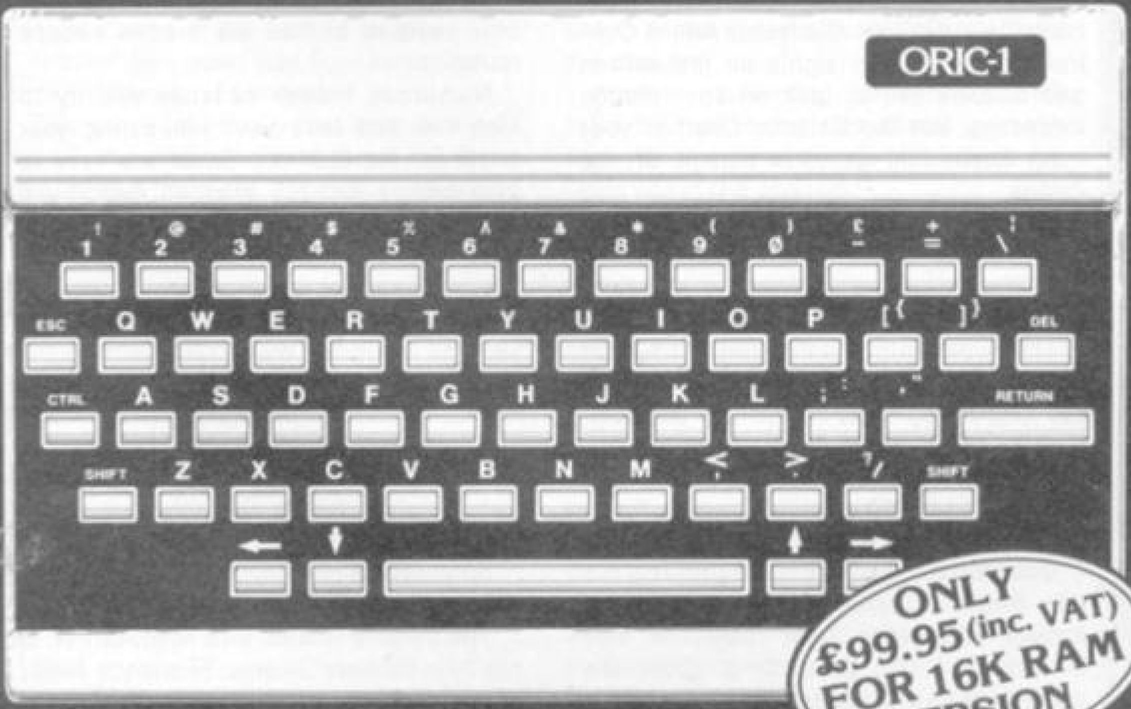

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REVIEWS

BOLDLY GOING WHERE OTHERS FEAR TO TREAD

STAR RAIDERS

Star Raiders was generally acknowledged as being a "state of the art" computer game when it was launched last year.

This jargon term simply means that in terms of quality of graphics, playability, and game development the cartridge is the best that present technology has produced.

The game puts you in the cockpit of an Atarian Federation star cruiser chasing the enemy Zylons through space.

By pressing a button on the computer keyboard a map of the galaxy is displayed. This shows the position of enemy ships and star-bases in relation to your craft.

There are three types of ships to be dealt with. Zylon Fighters are designed for high-speed attacks and can be deadly at close range.

Zylon Cruisers have assigned patrol routes within certain sectors and will only attack if provoked. Basestars can only be destroyed at close range. Use extreme caution when attacking a Basestar.

As well as enemy ships you will also have to avoid the masses of meteorites that are spinning through space.

To aid you in your mission you have a number of sophisticated battle and flight control instruments. Computer Attack Control flashes up gun sights on the screen and enables you to lock on your photon torpedoes, but the Galactic Chart is your most useful aid in your pursuit of the Zylons.

This shows you the entire galaxy divided into sectors containing either enemy starships, friendly starbases, or are completely uninhabited.

The Hyperwarp enables you to travel at accelerated speed to different sectors and the long range scan shows you the positions of approaching enemy fighters.

You can work your way up through the ranks of the star fleet while you play. Some of the ranks will amuse you.

Once this has been achieved the real fun can begin as you work your way up through the ranks from rookie to Star Commander. The good thing about the game is that it is pretty tough to win this top rank rating.

Star Raiders is available from most good Atari dealers at £29.95. Not cheap — but an excellent addition to your games library never the less. It runs on an Atari 400 and 800 with version also available for the VCS.

● **Getting started**	9
● **Value**	7
● **Playability**	8

BEWARE OF THE DEADLY BALROG

SORCERERS ISLAND

Once marooned on Sorcerers Island your only hope is to find the hidden escape route.

Numerous hidden beasties will try to stop you and take your life during your quest for the lost exit. Some are easy to deal with — but the dreaded Balrog will show no mercy.

You start this adventure with 2,000 life points which decrease as you battle with various monsters to collect the treasures you find along the way.

After each move you are a map of the island is available for your perusal — and you can also check out the spaces immediately next to your present position. Unfortunately neither show the exit or the monsters.

Sorcerers Island is one of two adventure games for the ZX81 from Psion.

The other — which also requires 16K to run — is Perilous Swamp. This is the easier of the two games, you have to rescue a princess from an evil wizard. There are more monsters and lots of action. I recommend you try Perilous Swamp first — I've yet to solve Sorcerers Island. If you like adventure games then this cassette is well worth the price of £4.95.

● **Getting Started**	7
● **Value**	7
● **Playability**	7

BUGGIES WILL SIMPLY DRIVE YOU CRAZY!

BAJA BUGGIES

This is very much like the VCS game Night Driver. But Gamestar, the new American Atari software company who released this new game have made full use of the superb graphics of the Atari computers.

The scene is set in the Californian desert. Sand-dunes lurk at the top of the screen with a golden sunset on the horizon.

The object of the game is to win the race. But as you start last there are 80 buggies in front of you! Your speed accelerates automatically and when you press the fire button your brakes go on. You have to slow down or you will lose control.

At the bottom of the screen there is a control panel. This shows your speed, your position in the race. There's a radar scan which shows how far you are from the finish line. The radar also shows where the leaders are.

If your averege speed is better than the speed already on the scoreboard you get a chance to put your initials up. If you wish to join the Baja Buggies Club you must take a photo of your initials to the manufacturers. In return they will send you a key-ring and membership card.

One of the annoying things with the game is that if you crash your buggy too often or go off the road too often your buggy will break-down and the game is over. Graphics wise buggies could be better. The sounds are also pretty poor in comparison with games like Preppie.

This 16K game for the Atari 400/800 was good fun to play but overall it was rather disappointing. Baja Buggies is available from Gemini Electronics of Manchester at £19.95.

● **Getting Started**	6
● **Value**	7
● **Playability**	6

DINING OUT WITH THE GHOSTS

SPECTRUM PACMEN

A stack of Pacman-type games have been cluttering up the *C&VG* reviews office over the last few weeks. A new maze gobbling game is added to the list of software available for the Spectrum at the rate of about one a week.

We tested a batch of the more obvious straight copies of the arcade original.

First on the screen was Spookyman from Abbex Software of London.

This game got off to a bad start as it did not tell me which keys to move my little man around the maze. A prime consideration in this game!

Although the maze looked fairly good the Pacman somehow failed to convince. It just didn't feel like controlling a little chap with a personality of his own.

Having just borrowed an Atari 400 with a Pacman cartridge I was used to much better player involvement in the game.

If you got caught by one of the ghosts the game paused for an annoyingly long period. There is also an absence of shrinking and gobbling sands and the characteristic gulp, gulp, gulp as you clock 200 then 400 and 800 in the arcade original.

Next up was Mazeman from Abersoft of Dyfed. This was the fastest and most playable of the pile but this too left a little too much to be desired.

The game produced no sound effects, bonus fruits or flashing ghosts.

All of the games would have been greatly improved by the use of a joystick. Playing Pacman without a joystick is rather like Blackpool without the illuminations.

Based on Pacman but with a few twists of its own was Gulpman from Campbell Systems of Essex. This game offered thorough instructions with a comprehensive list of game options.

You could choose one of fifteen mazes and vary the speed of your little man and the chasers.

Another interesting variation on the basic Pacman theme was a laser-gun with a limited amount of energy with which you could shoot the chasers.

On the minus side Gulpman has pretty basic graphics. The Gulpman for example moves around the maze without moving his legs. It would have been more convincing had the program simulated some sort of *running motion*.

Artic Computing of Hull also produce a Pacman-type game called Gobbleman, which I believe is a fairly close copy of the arcade game. I cannot give you my comments on this game however as it steadfastly refused to load on my Spectrum.

I was not over impressed with any of these versions. I don't know if it's the software or the machine but frankly Spectrum Pacman is not a patch on its Atari and BBC model B counterparts.

But if you really want a Pacman for your Spectrum, Gulpman just pips Mazeman. You might be better advised going for some of the original maze chase games.

	Spookyman	Mazeman	Gulpman
● **Getting started**	6	8	9
● **Value**	5	6	6
● **Playability**	4	5	7

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continued on page 114 ▶

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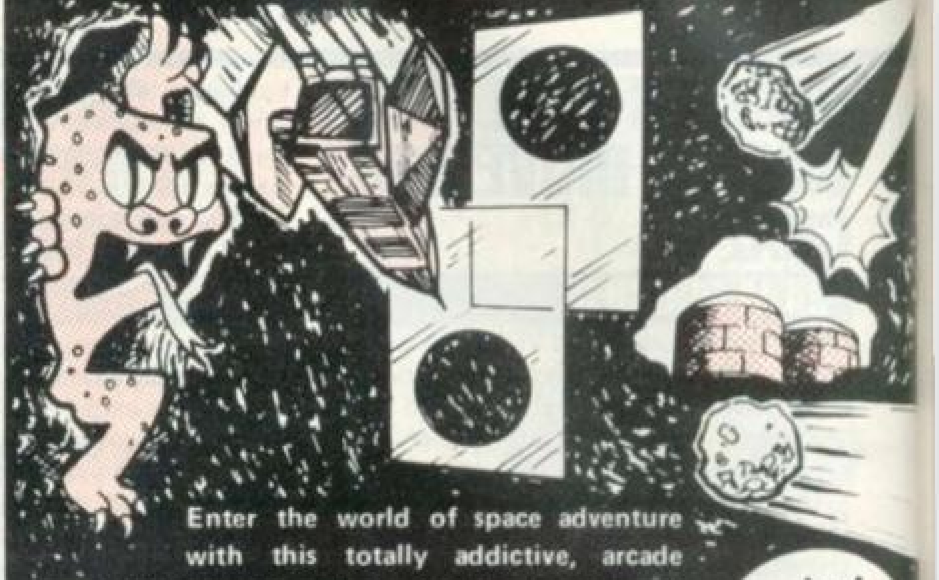

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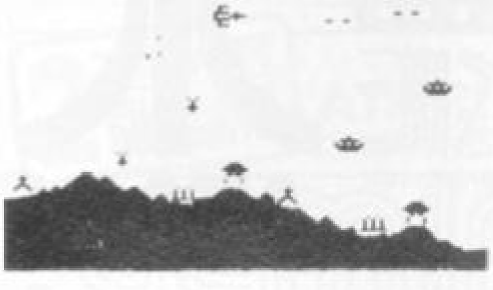

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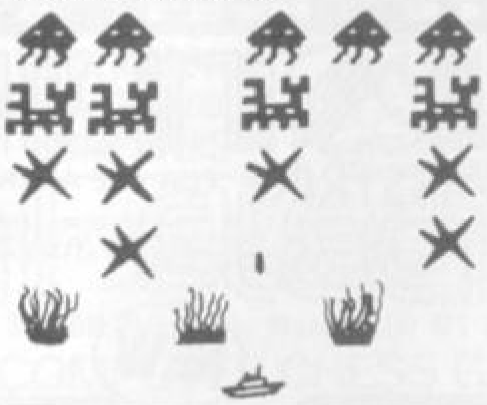

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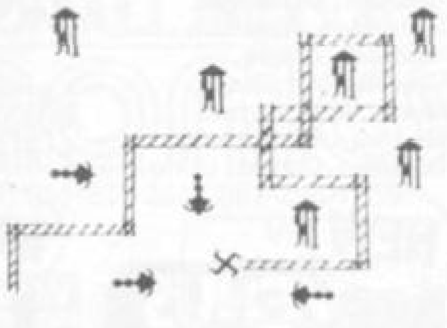

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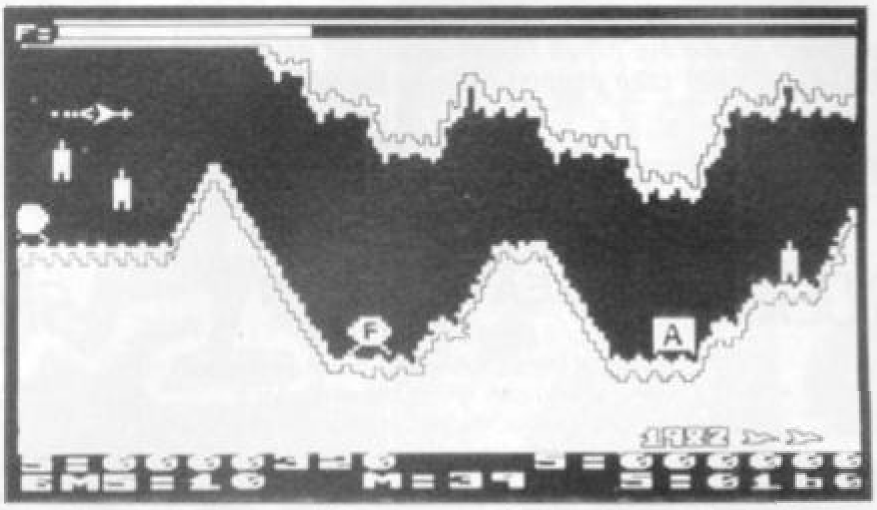

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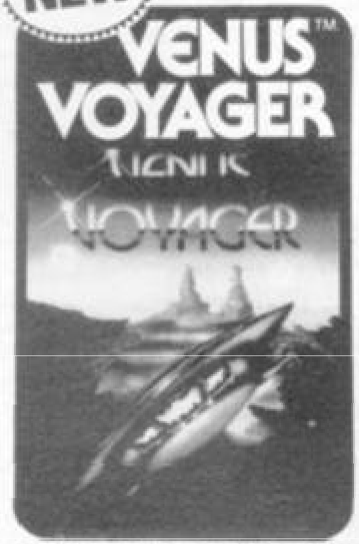

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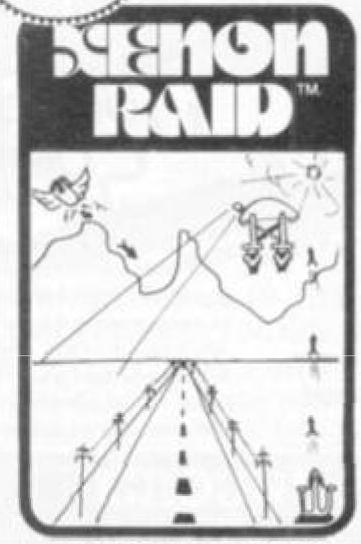

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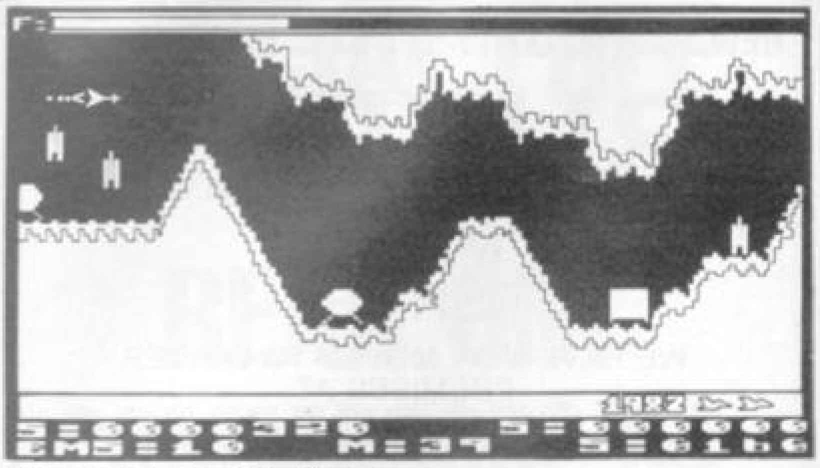

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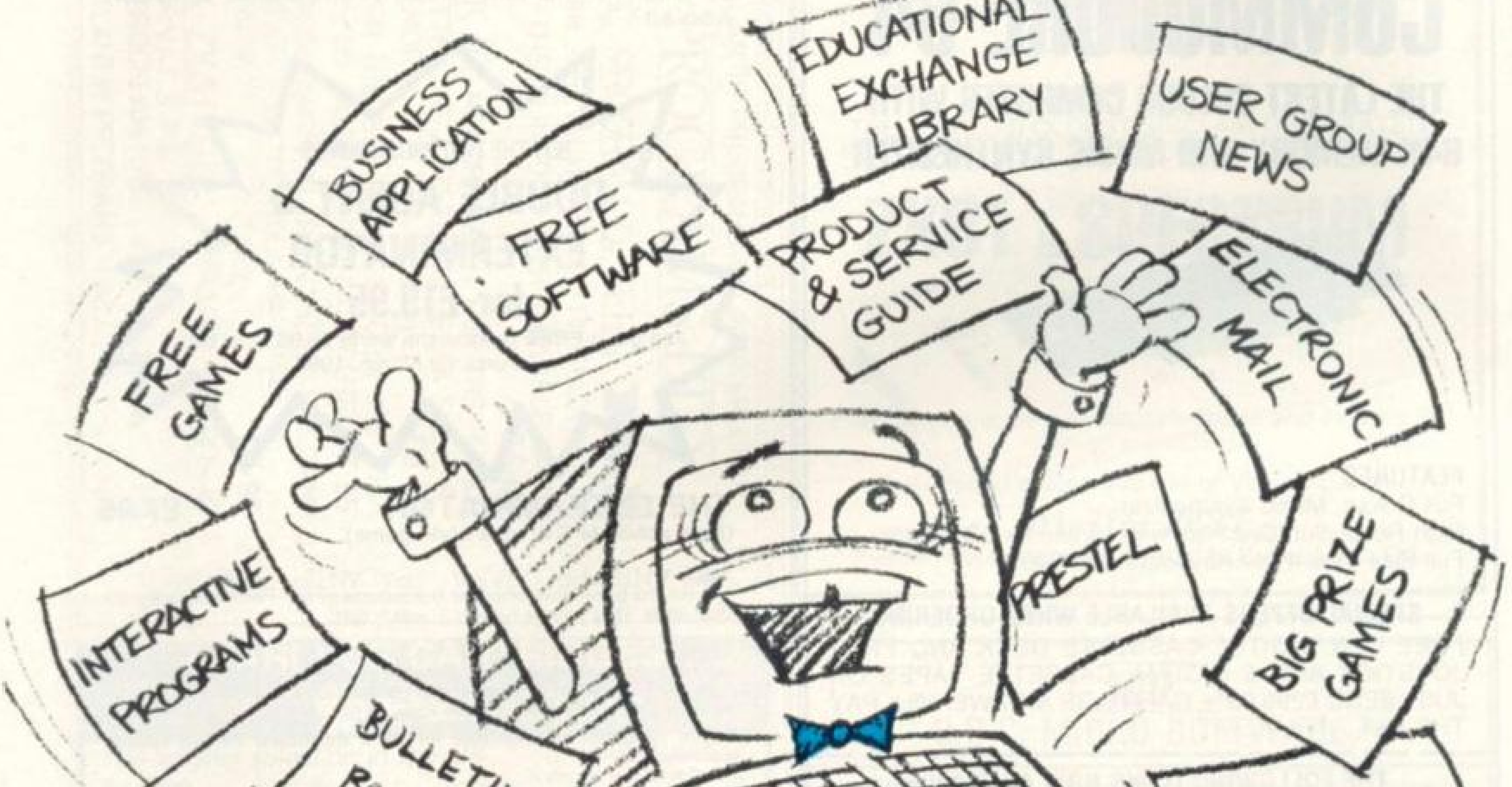
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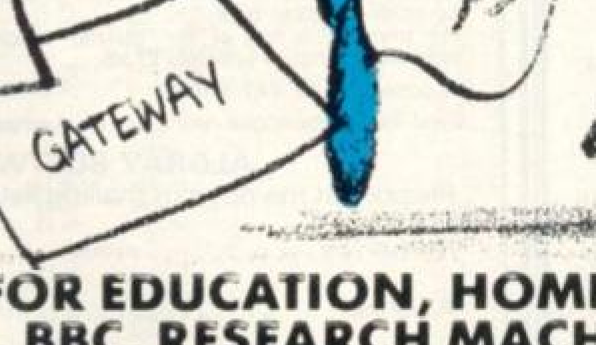
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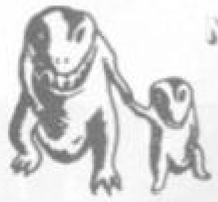

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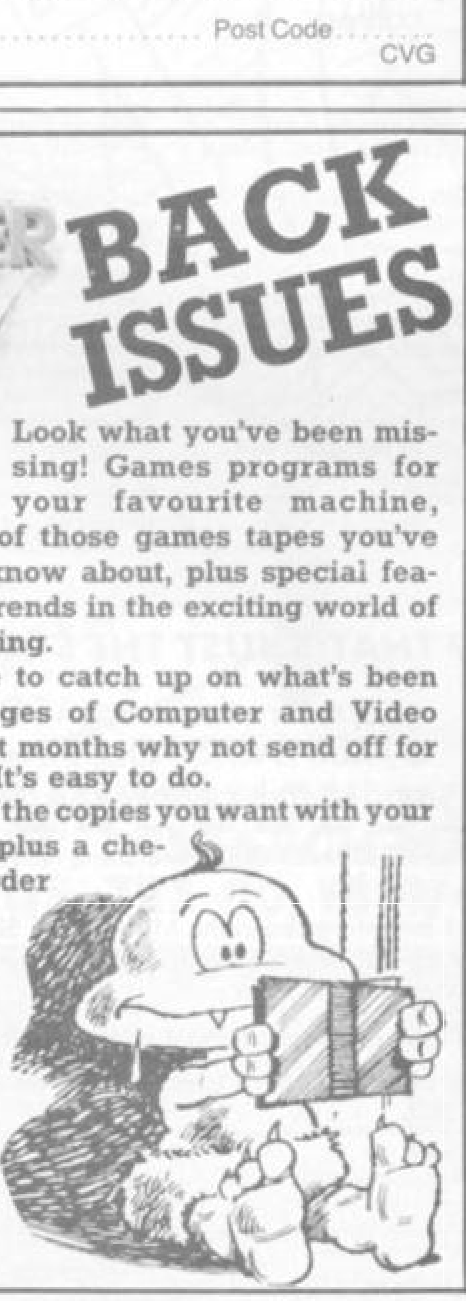

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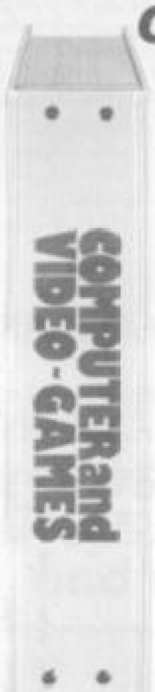

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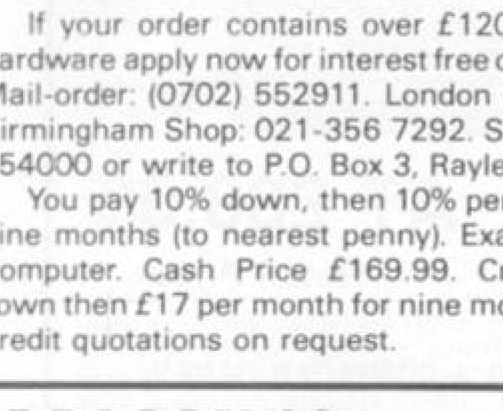
DRAGON 32



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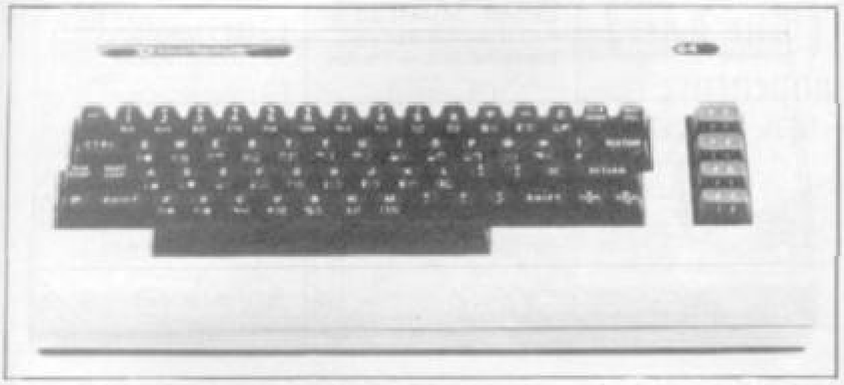

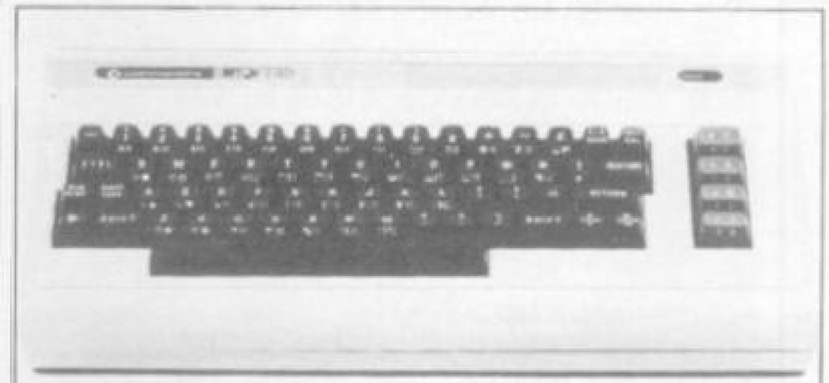

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Key: C = Cassette D = Disk E = Cartridge 2C = 2 Cassettes etc. 8K, 16K shows minimum memory requirement.

Note: Order codes shown in brackets. Prices correct at time of going to press. (Errors excluded)

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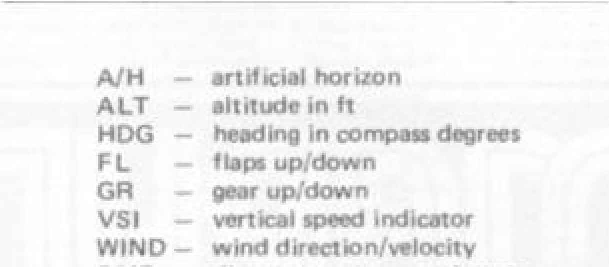

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Apex Trading 76
Atari 29
Automata 60
Blaby Video Centre 109
Buffer Micro Shop 104
Calisto Computers 26
Channel 1 Software 58
Chromasonic Electronics 4
Coin Controls 52
Commodore Computers 54/55
Computer Games 21,23
Cornforth Marketing 76
Database Software 74
Digital Fantasia 40
Electronequip 60
Eltec Services 88
English Software 102
Eurodeco 113
Foilkade 60
Gamer 74
Gemini Electronics 103
Gemini Software 96
Greye, J K 18
Hewson Consultants 112
Ibek Systems 105
Imagine 94/95
Interceptor Micros 11
Interface 18
Jade Computers 90
Kempston Microelectronics 103
Landau 88
Lansdowne Computers 109
Leisuronics 109
Llamasoft Software 76
Maplin 110/111
McLothorien 96
Microcomputer Software Club 34
Micromania 50
Micronet 106/107
Micropower ..... OBC
Microspot 103
Mikrogen 74
MP Software 104
Mr Micro 112
New Generation Software 108
Oric Products 64
M Orwin 61
Palantir 104
Pancom 104
Plessis 113
Ram Electronics 50
Reed Fox 80
Romik Software 101
SBD Software 6
Silica Shop 20
Silversoft 115
Sinclair Research 70/71
SIR Computers 96
Soft Deal 64
Soft Toys 112
Software For All 83
Spectrum 12, 13, 14, 15
Tangerine Computer Systems 97
Thorn EMI 46/47
Timedata 80
Titan Products 100
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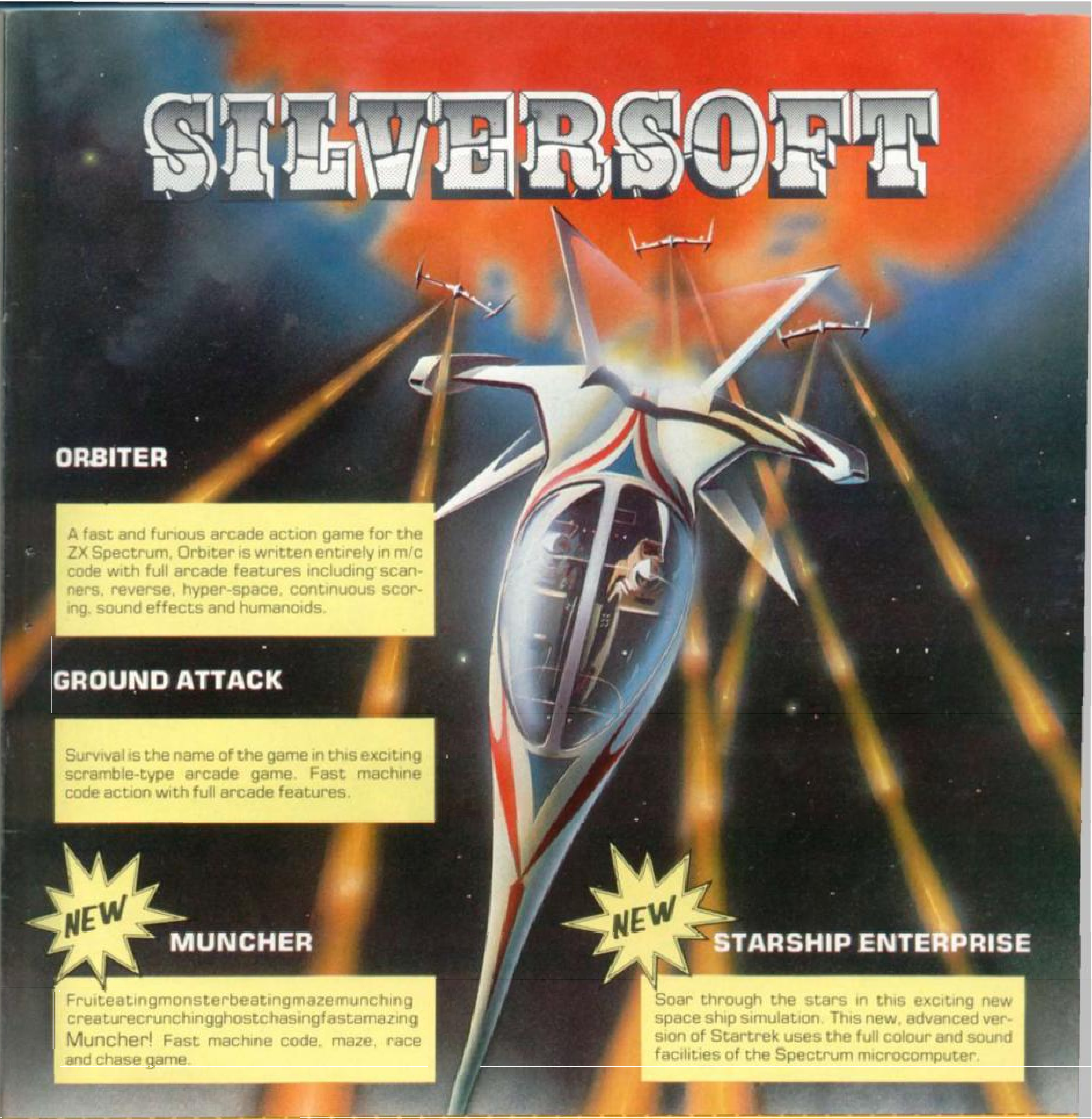

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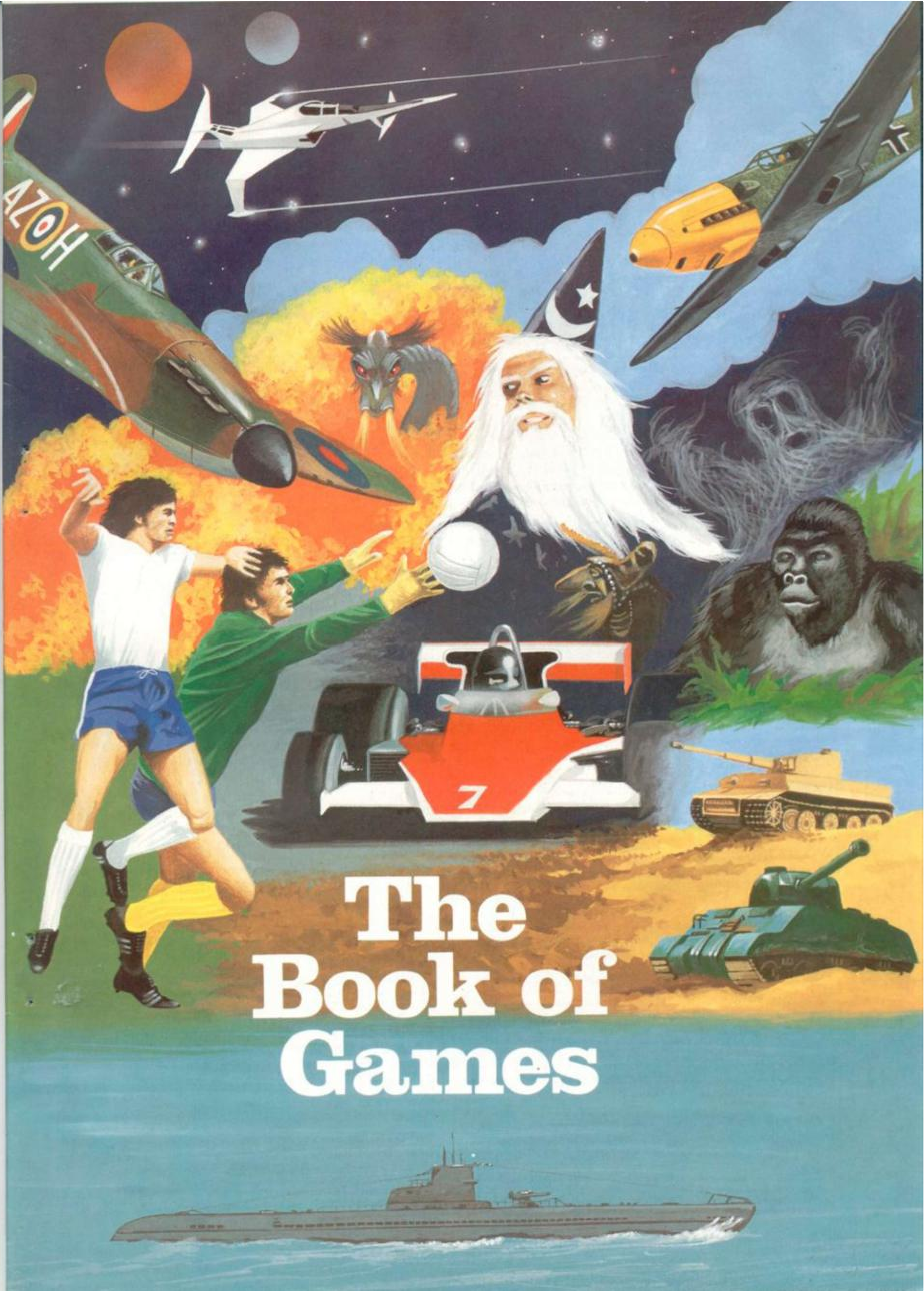


The Book of Games

The Book of Games

FEBRUARY 1983

Wondering just what to do with the micro you got for Christmas? At a loose end when it comes to game ideas? Never fear – the Book of Games is here!

The *Computer and Video Games* office is regularly deluged with programs from readers – more than enough to keep the magazine full for the next few centuries. So in order to bring you some of the best games that we've received – but which have not been published within the pages of *C&VG* – we decided to put them together in this bumper bundle of post-Christmas fun.

All the games have been tried and tested by our busy team of reviewers so any bugs should be few and far between. We also tried to keep the programs short and sweet with the exception of World Cup. We thought it was worth giving more space to. It's a version of the game first published for the Sharp in our June issue – converted for the BBC machine. It proved popular with Sharp owners – so now BBC fans will get a chance to have a crack at the big match.

CONTENTS

DRACULA..3
This one will send shivers down your spine. A haunting experience for owners of those sinister black **ZX81's.**

WORDFIND 4
Remember Hangman, that game you used to play on rainy afternoons? Well now it has been transferred to the **Atari**.

INVADERS..5
No compendium of games would be complete without a version of this all time arcade favourite. Blast those little green men on your **Spectrum.**

MASTER-MIND..6
Test your powers of logic and deduction on the **TRS-80**, model II and III.

REACTION 8
How quick are you? Can you beat your **Vic-20** to the punch? Program this game in and stand by for action!

PYRAMID OF SECRETS 10
Delve in the dark corridors of a long lost tomb in search of a mysterious treasure. Only the bravest **TRS-80** owners need apply.

SNAKES..12
Are you a slippery customer? Then here's your chance to prove it! Slither up to your **Atari** and program in this addictive serpentine challenge.

RED ALERT..13
Scramble! The aliens are coming and it's your job to stop them. The action takes place in caverns on a distant planet. But you can bring it home on your **Vic-20.**

MAGIC SQUARE 14
Baffled, bothered and bewildered? You will be after trying out this little number on your **Atom**.

BREAKOUT 15
All the colours of the **Spectrum** are used in this all action arcade style game. If you don't want to become another brick in the wall — knock them down!

AIR ATTACK..16
There's an air-sea battle raging in the circuits of an **Atari 400.** Watch out for those armoured balloons — they are just as dangerous as the high-speed jet fighters . . .

WORLD CUP..17
Return to those heady days of summer when the World Cup was still up for grabs. How would you have coped as manager of a top team. The big match awaits on your **BBC** micro.

BOMBER..27
You are the pilot on a do or die mission. Your ancient fighter is running out of fuel. You are flying over a city full of skyscrapers. You need somewhere to land. What happens next? Take to the sky in your **BBC** powered plane to find out!

ALIEN ATTACK 28
Here they come again! You can't keep a good alien down. This time only **Sharp** owners can save the universe from bug-eyed monsters.

S.O.S MISSION 29
Welcome captain, you are in charge of our latest space-battlecruiser on a mission to a planet infested with enemy bases. Can you destroy them before they get you? Sit down at your **Pet** and find out.

COPY 34
Beat your **Atom** at its own game. Match every move it makes and you'll be a winner. If you fail . . . well, computers can be very nasty sometimes.

GHOSTS 34
Watch out for the anti-matter. Beware of the ghosts. Enjoy playing this spirited **Spectrum** game!

3D MAZE 35
Wander around this impressive graphic maze and attempt to get out. Are you **Sharp** enough to find the exit?

GRAPHICAL GOLF 37
This game gets the real game of golf off to a tee. There are all the frustrating hazards of the real game — plus the big thrills. Can you score a hole in one on your **ZX81?**

DODGEMS 39
There's more than a touch of motorway madness about this four-wheeled wonder for the **BBC** model B.

ALPHA ATTACK 41
You are the last survivor on a planet devasted by an alien attack. Can you save your home with your **Vic** powered laser?

PACMAN 42
This arcade funster has inspired pop-records, TV adverts t-shirts — and now this version for the **Apple.**

VICTORIAN SEWERS 45
Ace puzzler Stephen Shaw strikes again with this surprise package for the **Texas TI 99/4A**.

The Book of Games is a supplement to Computer & Video Games magazine. Editorial and advertisement offices: Durrant House, 8, Herbal Hill, London EC1R 5IB. Telephone Editorial: 01-278 6556. Advertising 01-278 6552 Published and distributed by EMAP National Publications Limited. Typeset by Advantage Filmsetting. Printed by Eden Fisher (Southend) Limited. © Computer & Video Games Limited ISSN 0261 3697.

DRACULA

BY STUART EARL

RUNS ON A ZX81 IN 16K

Listen to the children of the night . . . how sweet they sound. Ahh, there you are my dearrrrs. We must return to our resting place in Castle Dracula.

But look! There's the priest again. He thinks he'll finish us this time. But we'll defeat him yet!

In this charming resurrection of the Dracula story you play the evil count who is returning to his castle after a night out. You must evade the priest and avoid the garlic to reach your castle before sunrise which will spell your doom.

The program includes full instructions and has a high score feature which allows players to enter their names.

```
   1 LET Q=0
   2 LET N$="██████"
   3 FOR X=0 TO 21
   4 PRINT "████████████████████
████████████████"
   5 NEXT X
   6 PRINT AT 0,0
   8 LET D$="▀▀"
   9 LET V=0
  20 FOR X=1 TO 5
  30 PRINT "████████████████████
██▒▒▒▒▒▒▒▒▒▒"
  40 NEXT X
  50 PRINT AT 0,27;"███"
  60 PRINT AT 4,28;"▌"
  65 LET T=99
  70 LET C=20
  75 LET Z=2
  80 LET D=1
  90 LET A=INT (RND*10)+1
 100 LET B=INT (RND*26)-1
 110 LET H=6
 120 LET G=25
 130 LET X=INT (RND*20)+1
 140 LET Y=EXP (RND*24)+1
 150 LET E=INT (RND*20)+1
 160 LET F=INT (RND*24)+1
 170 LET I=INT (RND*20)+1
 180 LET J=INT (RND*24)+1
 190 LET K=INT (RND*24(+1
 200 LET L=INT (RND*20)+1
 210 LET M=INT (RND*24)+1
 220 LET N=INT (RND*20)+1
 230 PRINT AT C,D;"██"
 240 PRINT AT A,B;"█+"
 260 PRINT AT X,Y;"▒"
 270 PRINT AT E,F;"▒"
 280 PRINT AT I,J;"▒"
 290 PRINT AT K,L;"▒"
 300 PRINT AT M,N;"▒"
 310 SLOW
 315 IF INKEY$="1" THEN LET D$="
██"
 320 IF INKEY$="0" THEN LET D$="
█▄█"
 321 IF D$="▀▀" THEN LET Z=2
 322 IF D$="█▄█" THEN LET Z=1
 330 LET C=C+(INKEY$="6")-(INKEY
$="7")
 340 LET D=D+(INKEY$="8")-(INKEY
$="5")
 345 PRINT AT C,C;D$
 350 IF A>C AND V=0 THEN LET A=A
-1
 360 IF A<C AND V=0 THEN LET A=A
+1
 370 IF B>D AND V=0 THEN LET B=B
-1
 380 IF B<D AND V=0 THEN LET B=B
+1
 385 PRINT AT A,B;"█+"
 400 IF C=A AND D=B THEN GOTO 10
00
 410 PRINT AT C-1,D+1;"█"
 420 PRINT AT C+1,D+1;"▀"
 430 IF A<C THEN LET A=2
 440 IF A>20 THEN LET A=20
 450 IF B>24 THEN LET B=24
 460 IF C<2 THEN LET C=2
 470 IF C>20 THEN LET G=20
 480 IF D<2 THEN LET D=2
 490 IF D>30 THEN LET D=30
 505 IF Z=1 THEN GOTO 520
 510 IF (C=X AND D+1=Y) OR (C=E
AND D+1=F) OR (C=I AND D+1=J) OR
 (C=K AND D+1=L) OR (C=M AND D+1
=N) THEN GOTO 1000
 520 IF (A=X AND B+1=Y) OR (A=E
AND B+1=F) OR (A=I AND B+1=J)<>(
A=K AND B+1=L) OR (A=M AND B=1=N
) THEN LET V=1
 530 LET G=INT (RND*7)+24
 540 PRINT AT H,G;"█+"
 550 IF C=H AND D+1=G+1 AND Z=2
THEN GOTO 1000
 560 PRINT AT 0,0;T;AT 0,10;"HIG
H=";Q;"  ";N$
 565 PRINT AT H,G;"  "
 570 IF Z=2 THEN LET T=T-1
 580 IF Z=1 THEN LET T=T-2
 590 IF S=0 THEN GOTO 1000
 600 IF C=4 AND D=27 THEN GOTO 2
000
 610 GOTO 260
1000 PRINT "YOU ARE DEAD.SCORE=
";100-T
1001 IF 100-T>Q THEN PRINT "NAME
 1 TO 6 LETTERS"
1002 IF 100-T>Q THEN INPUT N$
1003 IF LEN N$>6 THEN GOTO 1001
1005 IF 100-T>Q THEN LET Q=100-T
1100 PRINT "ANOTHER GO:"
1200 IF INKEY$="" THEN GOTO 1200
1230 IF INKEY$<>"Y" THEN GOTO 12
00
1235 CLS
1240 GOTO 3
2000 PRINT "WELL DONE YOU XAVE R
EACHED THE  CASTLE; SCORE=";T*2
2050 IF T*2>Q THEN PRINT "NAME 1
 TO 6 LETTERS"
2060 IF T*2>Q THEN INPUT N$
2070 IF LEN N$>6 THEN GOTO 2050
2100 IF T*2>Q THEN LET Q=T*2
2200 GOTO 1100
7000 PRINT "           DRACULA BY S.
EARL.      "
7010 PRINT "--------------------
------------"
7020 PRINT "5=LEFT  8=RIGHT  6=D
OWN  7=UP"
7030 PRINT " YOU TAKE THE ROLE O
F DRACULA.  YOU HAVE GOT 100 SEC
ONDS TO GET TO YOUR CASTLE.YOU A
RE THE ▀   THE VIPLAGERS HAVE D
UG PITS ▒  YOU MUST LURE THE HO
LY CROSS   WHICH IS OUT TO GET
YOU INTO ONEIF YOU ARE SUCCESSFU
L HE WILL  STOP IF NOT YOY ARE
DEAD.      IF YOU EALL IN A PIT
,YOU ARE   DEAD. "
7050 PRINT "  IF YOU PRESS 0 YOU
TURN INTO  A BAT AND CANT FALL
 IN A PIT  WHIPE YOU ARE A BAT
THE TIME   BEFORE DAYLIGHT GOE
S TWICE AS  QUICK.PRESSING 1 TU
RNS YOU BACK IF DAYLIGHT BREAKS
YOU ARE DEAD"
7060 PRINT "  IF YOU GET TO THE D
OOR WATCH  OUT FOR THE SWINGING
 GARLIC"
7080 PRINT "PRESS N/L"
7090 INPUT A$
7095 CLS
8000 RUN
9000 SAVE "DRACULA"
9100 GOTO 7000
```

WORDFIND

The object of Word Find is to guess the hidden word entered into the computer's memory by your opponent. You simply have to type in your choice of letters which will gradually reveal the secret word.

There is a catch however. Just like the pen and paper game Hangman an unfortunate character is gradually progressing toward his doom each time you make a wrong guess.

Will you be able to beat your opponent – and the Hangman – before the poor little chap starts to dangle?

The 's' character is a clear screen command and it appears in lines 500, 520 and 530. The 'c' in line 1035 should be typed in inverse video.

BY A. J. DAVIS

RUNS ON AN ATARI 400

IN 16K

```
5 OPEN #1,4,0,"K:"
10 DIM ANSWER$(20),GUESS$(1),ALPHABET$(2
6),USER$(20),CLUE$(15)
20 GOTO 500
30 GRAPHICS 7
35 COLOR 3
40 IF X>=1 THEN PLOT 20,79:DRAWTO 20,20
42 IF X>=2 THEN PLOT 10,79:DRAWTO 20,59:
DRAWTO 30,79
44 IF X>=3 THEN PLOT 20,30:DRAWTO 30,20
46 IF X>=4 THEN PLOT 20,20:DRAWTO 80,20
50 IF X>=5 THEN PLOT 65,20:DRAWTO 65,25:
FOR I=1 TO 35:COLOR 1:READ A,B:PLOT A,B:
NEXT I:RESTORE
60 DATA 63,26,64,26,65,26,66,26,67,26,62
,27,63,27,64,27,65,27,66,27,67,27,68,27,
62,28,63,28,65,28,67,28,68,28
70 DATA 62,29,63,29,64,29,66,29,67,29,68
,29,62,30,63,30,64,30,65,30,66,30,67,30,
68,30,63,31,67,31,64,32,65,32
80 DATA 66,32
90 IF X>=6 THEN COLOR 2:FOR I=61 TO 69:F
OR J=34 TO 44:PLOT I,J:NEXT J:NEXT I
100 IF X>=7 THEN COLOR 1:PLOT 60,34:DRAW
TO 57,39:DRAWTO 57,46:PLOT 60,35:DRAWTO
58,39:DRAWTO 58,46
110 IF X>=8 THEN COLOR 1:PLOT 70,34:DRAW
TO 73,39:DRAWTO 73,46:PLOT 70,35:DRAWTO
72,39:DRAWTO 72,46
120 IF X>=9 THEN COLOR 3:PLOT 61,45:DRAW
TO 69,45:FOR I=61 TO 64:COLOR 2:PLOT I,4
6:DRAWTO I,57:NEXT I
125 IF X>=9 THEN COLOR 3:PLOT 62,58:DRAW
TO 63,58:PLOT 61,59:DRAWTO 64,59
130 IF X=10 THEN COLOR 2:PLOT 65,46:DRAW
TO 65,50:FOR I=66 TO 69:PLOT I,46:DRAWTO
 I,57:NEXT I
135 IF X=10 THEN COLOR 3:PLOT 67,58:PLOT
 68,58:PLOT 66,59:DRAWTO 69,59
140 IF X<10 THEN 490
145 FOR T=1 TO 750:NEXT T
150 GRAPHICS 1+16:COLOR 1:SETCOLOR 0,0,0
:SETCOLOR 4,0,8:? #6;"THE ANSWER WAS ":?
 #6:? #6:? #6;ANSWER$
160 FOR I=1 TO 5:FOR J=1 TO 200:SOUND 0,
J,8,10:NEXT J:SOUND 0,0,0,0:NEXT I
180 RUN
490 FOR T=1 TO 500+50*X:NEXT T:SOUND 0,0
,0,0:GOTO 600
500 ? "}WORDFIND":? :POKE 752,1:? "Do yo
u want instructions (Y or N) ?":GET #1,K
510 IF CHR$(K)="Y" THEN GOSUB 1000
515 ANSWER$=""
520 POKE 752,1:? "}INPUT YOUR WORDS":? "
(not more than 20 letters).":? "?"
522 FOR I=1 TO 20:GET #1,K:ANSWER$(I,I)=
CHR$(K):IF CHR$(K)="*" THEN ANSWER$(I,I)
=" ":GOTO 527
```

```
524 NEXT I
525 IF LEN(ANSWER$)>20 THEN 515
527 CLUE$=""
530 ? :? "}INPUT YOUR CLUE":? "(not more
 than 15 letters)":INPUT CLUE$
535 IF LEN(CLUE$)>15 THEN CLUE$="":GOTO
527
540 USER$="":FOR I=1 TO LEN(ANSWER$):USE
R$(I,I)="-":IF ANSWER$(I,I)=CHR$(32) THE
N USER$(I,I)=CHR$(32)
545 IF ASC(ANSWER$(I,I))<65 OR ASC(ANSWE
R$(I,I))>90 THEN USER$(I,I)=ANSWER$(I,I)
550 NEXT I
590 X=0:Y=1
600 GRAPHICS 2:COLOR 1
610 POSITION 0,3:? #6;USER$
620 POSITION 0,9:COLOR 2:? #6;"CLUE:";CL
UE$
630 ? :? "LETTERS USED:-";ALPHABET$:? "I
NPUT YOUR GUESS":GET #1,K:GUESS$=CHR$(K)
:ALPHABET$(Y,Y)=GUESS$:Y=Y+1
635 IF Y>26 THEN Y=26
640 FOR I=1 TO LEN(ANSWER$):IF GUESS$=AN
SWER$(I,I) THEN USER$(I,I)=GUESS$:Z=Z+1:
POSITION I-1,3:? #6;GUESS$:F=1
650 IF F=1 THEN GOTO 665
660 NEXT I:GOTO 670
665 FOR J=1 TO 20:SOUND 0,50,10,14:NEXT
J:SOUND 0,0,0,0:F=0:GOTO 660
670 IF USER$=ANSWER$ THEN GOTO 900
680 IF Z=0 THEN X=X+1:SOUND 0,200,4,12:G
OTO 30
690 Z=0
700 GOTO 630
900 ? "CORRECT"
910 GRAPHICS 2+16:FOR T=1 TO 4:FOR S=1 T
O 15:SETCOLOR 0,S,12/T:POSITION 0,3:? #6
;"CORRECT":SOUND 0,200/S,10,10
915 SETCOLOR 4,16-S,T:POSITION 0,6:? #6;
ANSWER$:SOUND 1,200/T,10,10
920 FOR TIME=1 TO 20:NEXT TIME
930 NEXT S:NEXT T
940 SOUND 0,0,0,0:SOUND 1,0,0,0:RUN
1000 ? :? "The object of WORDFIND is to
guess the";:? "hidden word entered by yo
ur opponent"
1010 ? :? "Your opponent must enter the
word(s)  of his choice letter by letter
and  . press '*' to end it."
1020 ? :? "You must guess letters in tur
n. To do this simply type the letter of
your"
1025 ? "choice."
1030 ? :? "The computer will do the rest
."
1035 ? :? "PRESS C TO CONTINUE":GET #1,K
:IF CHR$(K)="C" THEN RETURN
1040 GOTO 1035
```

INVADERS

BY ANDREW FILBY

RUNS ON A SPECTRUM IN 16K

Those nasty aliens are back again. And they are as dangerous as ever.

You can defend yourself using your laser base. But you can only fire three times at any one alien. The good news is that you can blast their missiles with your laser. The bad news is that those missiles will home in on you.

You may also use the life saving hyperspace button — but only six times. And each time you press the panic button your score decreases.

The lower the alien is before you blast him the more you'll score — but you only have five lives to play with, so don't let them get too close! Use 'm' to move right, 'b' to go left, and 'n' to fire.

```
   2 LET uy=0: LET lk=0: LET lo=
0: GO SUB 1000: PAPER 6: LET a$=
"": CLS : LET hs=0: INK 2: BORDE
R 1
   3 DATA 0,0,BIN 00110110,BIN 0
0110110,BIN 00011100,BIN 0001110
0,BIN 00011100,BIN 00001000
   4 DATA BIN 10001001,BIN 00100
010,0,BIN 01011001,BIN 00001100,
BIN 10100000,BIN 00001000,BIN 10
100001
   5 DATA BIN 00011000,BIN 00111
100,BIN 00111100,BIN 11111111,BI
N 11111111,BIN 11111111,BIN 1100
0011,BIN 11000011
   6 DATA BIN 00111001,BIN 00111
111,BIN 00000011,BIN 11110011,BI
N 00011111,BIN 00011111,BIN 1111
0110,BIN 00000010,BIN 11100000,B
IN 11100000,BIN 00000100,BIN 000
11111,BIN 11111111,BIN 11111000,
0,0
   7 LET sc=0: LET rt=0: LET li=
4
   8 PRINT "SCORE:";sc
  10 LET l=15
  20 LET b=10
  21 FOR n=144 TO 148
  25 FOR f=0 TO 7: READ a: POKE
USR CHR$ (n)+f,a: NEXT f
  26 NEXT n
  28 PRINT AT 0,15;"▲";TAB 20 ;"
▲";TAB 25;"▲";TAB 30;"▲"
  29 FOR g=1 TO 9e9
  34 LET k=(RND*19)+1
  35 FOR u=0 TO 29
  40 PRINT AT 21,l;"▲"
  50 PRINT AT k,u;"✱"
  51 IF sc<1 THEN LET sc=0
  55 PRINT AT 0,5;sc;" "
  60 IF INKEY$="n" THEN GO TO 20
0
  61 IF RND<.93 THEN GO TO 78
  62 LET uy=u: LET lo=1
  63 FOR c=INT (k+1.5) TO 21
  64 PRINT AT c,uy;"▼"
  65 IF SCREEN$ (c+1,uy)<>" " TH
EN GO TO 400
  66 PRINT AT c,uy;" ": IF INKEY
$="n" THEN GO SUB 200
  67 IF l<uy THEN LET uy=uy-1
  68 IF l>uy THEN LET uy=uy+1
  71 IF INKEY$="v" AND rt<=5 THE
N GO TO 500
  75 NEXT c: LET lo=0
  79 PRINT  AT k,u;"  ";AT 21,l;
"  "
  80 IF INKEY$="m" THEN LET l=l+
1.5
  90 IF INKEY$="b" THEN LET l=l-
1.5
 100 IF l>=31 THEN LET l=31
 110 IF l<=5 THEN LET l=5
 190 NEXT u
 191 LET lk=0
 195 NEXT g
 199 STOP
 200 PLOT 8*l+3,3
 201 LET lk=lk+1
 202 IF lk>3 AND lo=1 THEN RETUR
N
 203 IF lk>3 THEN GO TO 61
 205 BEEP .05,9
 210 DRAW 0,ABS ((8.3333333*k)-
175)
 230>PLOT 8*l+3,3
 240 DRAW OVER 1;0,ABS ((8.33333
333*k)-175)
 255 IF SCREEN$ (k,l)<>" " THEN
GO TO 300
 256 IF l<>uy AND lo=1 THEN RETU
RN
 260 GO TO 61
 300 PRINT AT k,l;"※"
 310 FOR f=1 TO 9: BEEP .02,f: N
EXT f
 315 LET sc=sc+ INT (100*k)
 320 PRINT AT k,l-1;"   "
 325 PRINT
 330 GO TO 191
 400 PRINT ;AT 0,li*5+10;;" "
 410 INK 9
 420 PRINT AT 20,l;"※";AT 21,l-1
;"※※※"
 430 FOR f=-10 TO 10
 440 BEEP .05,f
 445 BORDER RND*6+1
 450 NEXT f
 455 PRINT AT k,u;"  "
 460 PRINT AT 20,l;" ";AT 21,l-1
;"   "
 465 INK 2
 470 LET li=li-1
 480 IF li=-1 THEN GO TO 800
 490 GO TO 191
 500 PRINT AT 10,9; INVERSE 1;"H
YPERSPACE"; INVERSE 0
 501 FOR f=10 TO 0 STEP -1
 502 PRINT AT 21,l;" ";AT k,u;"
"
 510 BORDER RND*6+1: BEEP .02,f
 520 NEXT f
 530 BEEP 1,-10
 535 LET l=RND*31
 536 LET sc=sc-INT (100/k)*2
 537 PRINT AT 10,9;"           "
 538 LET rt=rt+1
 540 GO TO 191
 800 PRINT AT 10,0; INVERSE 1;"
    YOU SCORED ";SC;"
     AND SURVIVED ";G;" ATTACK W
AVES     " ; INVERSE 0
 801 IF sc>hs THEN PRINT "YOU HA
VE beaten ";a$;"'s HIGH SCORE of
";hs: INPUT "please input name"
;a$: LET hs=sc
 802 PRINT a$;" has a high score
 of ";hs
 810 PRINT AT 21,0; INVERSE 1;"p
ress 'a' to play again"; INVERSE
 0
 811 RESTORE
 812 PAPER 6: BORDER 1
 815 IF sc>hs THEN LET hs=sc
 820 LET l$=INKEY$
 840 IF l$="a" THEN CLS : GO TO
7
 850 GO TO 820
1000 PAPER 1: CLS : INK 7
1004 PRINT TAB 4; INVERSE 1;"SPA
CE ATTACK--©-- A.FILBY"; INVERSE
 0
1010 PRINT ''"The object of the
game is to shoot down as many sp
ace ships (✱)as possible from y
our laser base (▲)."
1020 PRINT '"At random the alien
s will fire  at you,their bombs(
▼) will home in on you.If one is
 on target   you can go into
HYPERSPACE to be safe,but it wil
l decrease   your score.  The lo
wer an alian is the more  points
 it is worth.You have  5 lives a
nd you can   move from side to s
ide     at     1.5 times   as fast
as an alien."
1021 PRINT "You can useHYPERSPAC
E 6 times,but you can only fire
at any alien 3 times.your laser
can stop th bombs"
1040 PRINT '"Use 'm' to move rig
ht,'b'to moveleft and 'n' to fir
e."
1050 PRINT "'v' puts you into Hy
perspace"
1060 INPUT "press 'enter' to sta
rt";p$
1100 RETURN
```

MASTERMIND

Can you crack the hidden code? If you can you'll be really worthy of the title of *C&VG* mastermind!

The program plays the part of the code-maker in the popular game of Mastermind. One of its strongest features is the use of graphics, both in the initial display and in the depiction of the Mastermind board.

The idea behind the game' for those unfamiliar with it, is that a code is set-up, which has to be discovered in as few attempts as possible. The difficulty factor may be altered in two ways.

Firstly the number letters in use may be varied. Secondly the number of positions in the code may be varied. In this game the first option is the one used to provide different levels of play.

On RUNning the program there is an initial graphic title frame (10-90, 2390-2410). Then there is a brief set of instructions (100-160).

Then the level of play can be entered by the user typing 1,2 or 3.

```
10              REM* GRAPHIC DISPLAY *
20 CLS
30 FORX=1TO100:Z=RND(1023):PRINT@Z,".";:NEXTX
40 FORX=0TO127:Y=0:SET(X,Y):Y=47:SET(X,Y):NEXTX
50 FORY=0TO47:X=0:SET(X,Y):X=127:SET(X,Y):NEXTY
60 FORZ=1TO266:READX:READY:SET(X,Y):NEXTZ
70 PRINT@904,"MASTER MIND   by Daniel Bishop. Copyright, 1982.";
80 FORX=1TO1500:NEXTX
90 CLS
100      REM* INSTRUCTIONS *
110 PRINT"Master Mind - a game of logic... . .  ."
120 PRINT"The computer sets up randomly a four letter code. The object of the ga
me is to deduce, by trial and error, the letters and theirpositions in the fewes
t possible goes. You may choose to play   with 6,8 or 10 letters."
130 PRINT"Level I   : A,B,C,D,E,F                                        Level
II  : A,B,C,D,E,F,G,H                                      Level III : A,B,C,D,E,
F,G,H,I,J"
140 PRINT"Your score is shown thus: ";CHR$(143);"correct letter, correct positio
n."
150 PRINT"                             ";CHR$(137);"correct letter, wrong position.
"
160 PRINT"Note! the positions of the scoring pegs bear no relation to the positi
ons of the letters in the code. To resign during the game type R."
170             REM* SET UP CODE *
180 DEFSTRK,T
190 PRINT:PRINT"Do you wish to play at Level I (1), Level II (2), Level III (3)?
";
200 L$=INKEY$:IF L$<>"1" AND L$<>"2" AND L$<>"3" THEN 200
210 IF L$="1" THEN L=6
220 IF L$="2" THEN L=8
230 IF L$="3" THEN L=10
240 FOR Z=1 TO 4
250 R=RND(L):IFR=1THENK(Z)="A"
260 IFR=2THENK(Z)="B"
270 IFR=3THENK(Z)="C"
280 IFR=4THENK(Z)="D"
290 IFR=5THENK(Z)="E"
300 IFR=6THENK(Z)="F"
310 IFR=7THENK(Z)="G"
320 IFR=8THENK(Z)="H"
330 IFR=9THENK(Z)="I"
340 IFR=10THENK(Z)="J"
350 NEXTZ
360             REM* DRAW BOARD *
370 CLS
380 FOR X=4TO39
390 SET(X,1):SET(X,46):SET(X,9):SET(X,10):SET
```

```
(X,16):SET(X,22):SET(X,28):SET(X,34
):SET(X,40)
400 NEXTX
410 FOR X=21 TO39
420 SET(X,2):SET(X,3):SET(X,4)
430 NEXTX
440 FOR Y=1 TO 46
450 SET(4,Y):SET(39,Y)
460 NEXTY
470 FOR Y=1 TO 8: SET(21,Y):NEXTY
480 FOR Y=8 TO 41 STEP 3
490 Y=Y+1:SET(21,Y):Y=Y+1:SET(21,Y):Y=Y+1:SET(21,Y)
500 NEXTY
510 SET(21,45)
520 PRINT@68,"MASTER";:PRINT@132,"MIND";
530 FOR X=139TO146:PRINT@X,CHR$(143);:NEXTX
540 PRINT@147,CHR$(175);
550 V=260
560 W=269
570 FOR Y=1 TO 6
580 FOR X=-1 TO 6 STEP 2
590 PRINT@V+X,"O";
600 PRINT@W+X,"O";
610 NEXT X
620 V=V+128:W=W+128
630 NEXT Y
640 FOR X=60 TO 69:SET(X,6):NEXTX
```

```
650 FOR X=106TO 123:SET(X,6):NEXTX
660 PRINT@94,"Go";
670 IFL=6THENLL$="I"
680 IFL=8THENLL$="II"
690 IFL=10THENLL$="III"
700 PRINT@117,"Level ";LL$;
710 G=0
720             REM* GO LOOP *
730 G=G+1
740 PRINT@286,"Please type in your four letters.";
750 PRINT@97,G;
760 PRINT@414,"                                   ";
770 FOR Z=1 TO 4
780 T$=INKEY$:IFT$=""THEN 780
790 IF T$="R" THEN PRINT@414,"Do you wish to resign (Y/N)?";ELSE 820
800 Z$=INKEY$:IF Z$=""ORZ$<>"Y"ANDZ$<>"N"THEN 800
810 IF Z$="Y" THEN 1980 ELSE PRINT@414,"                                      ";
```

```
820 IF L=6 THEN 860
830 IF L=8 THEN 850
840 IFT$<>"A"ANDT$<>"B"ANDT$<>"C"ANDT$<>"D"ANDT$<>"E"ANDT$<>"F"ANDT$<>"G"ANDT$<>
"H"ANDT$<>"I"ANDT$<>"J"THEN 780 ELSE 870
850 IFT$<>"A"ANDT$<>"B"ANDT$<>"C"ANDT$<>"D"ANDT$<>"E"ANDT$<>"F"ANDT$<>"G"ANDT$<>
"H"THEN 780 ELSE 870
860 IFT$<>"A"ANDT$<>"B"ANDT$<>"C"ANDT$<>"D"ANDT$<>"E"ANDT$<>"F"THEN 780
870 T(Z)=T$
```

BY DANIEL BISHOP

RUNS ON A TRS80 MODELS I AND III

IN 16K

```
880 IFG=1ANDZ=1THENPRINT@908,T$;
890 IFG=1ANDZ=2THENPRINT@910,T$;
900 IFG=1ANDZ=3THENPRINT@912,T$;
910 IFG=1ANDZ=4THENPRINT@914,T$;
920 IFG=2ANDZ=1THENPRINT@780,T$;
930 IFG=2ANDZ=2THENPRINT@782,T$;
940 IFG=2ANDZ=3THENPRINT@784,T$;
950 IFG=2ANDZ=4THENPRINT@786,T$;
960 IFG=3ANDZ=1THENPRINT@652,T$;
970 IFG=3ANDZ=2THENPRINT@654,T$;
980 IFG=3ANDZ=3THENPRINT@656,T$;
990 IFG=3ANDZ=4THENPRINT@658,T$;
1000 IFG=4ANDZ=1THENPRINT@524,T$;
1010 IFG=4ANDZ=2THENPRINT@526,T$;
1020 IFG=4ANDZ=3THENPRINT@528,T$;
1030 IFG=4ANDZ=4THENPRINT@530,T$;
1040 IFG=5ANDZ=1THENPRINT@396,T$;
1050 IFG=5ANDZ=2THENPRINT@398,T$;
1060 IFG=5ANDZ=3THENPRINT@400,T$;
1070 IFG=5ANDZ=4THENPRINT@402,T$;
1080 IFG=6ANDZ=1THENPRINT@268,T$;
1090 IFG=6ANDZ=2THENPRINT@270,T$;
1100 IFG=6ANDZ=3THENPRINT@272,T$;
1110 IFG=6ANDZ=4THENPRINT@274,T$;
1120 NEXT Z
1130 PRINT@414,"Do you wish to change them (Y/N)?";
1140 Z$=INKEY$:IF Z$=""ORZ$<>"Y"ANDZ$<>"N"THEN 1140
1150 IFZ$="Y"THEN 760
1160              REM* FIND SCORE *
1170 FOR Z=1 TO 4
1180 IF K(Z)="A"THENAK=AK+1
1190 IF K(Z)="B"THENBK=BK+1
1200 IFK(Z)="C"THENCK=CK+1
1210 IFK(Z)="D"THENDK=DK+1
1220 IFK(Z)="E"THENEK=EK+1
1230 IFK(Z)="F"THENFK=FK+1
1240 IFK(Z)="G"THENGK=GK+1
1250 IFK(Z)="H"THENHK=HK+1
1260 IFK(Z)="I"THENIK=IK+1
1270 IFK(Z)="J"THENJK=JK+1
1280 IFT(Z)="A"THENAT=AT+1
1290 IFT(Z)="B"THENBT=BT+1
1300 IFT(Z)="C"THENCT=CT+1
1310 IFT(Z)="D"THENDT=DT+1
1320 IFT(Z)="E"THENET=ET+1
1330 IFT(Z)="F"THENFT=FT+1
1340 IFT(Z)="G"THENGT=GT+1
1350 IFT(Z)="H"THENHT=HT+1
1360 IFT(Z)="I"THENIT=IT+1
1370 IFT(Z)="J"THENJT=JT+1
1380 NEXTZ
1390 FORZ=1TO4
1400 IFK(Z)<>T(Z)THEN 1510
1410 IF K(Z)="A"THENAK=AK-1:AT=AT-1:CC=CC+1
1420 IF K(Z)="B"THENBK=BK-1:BT=BT-1:CC=CC+1
1430 IF K(Z)="C"THENCK=CK-1:CT=CT-1:CC=CC+1
1440 IF K(Z)="D"THENDK=DK-1:DT=DT-1:CC=CC+1
1450 IF K(Z)="E"THENEK=EK-1:ET=ET-1:CC=CC+1
1460 IF K(Z)="F"THENFK=FK-1:FT=FT-1:CC=CC+1
1470 IF K(Z)="G"THENGK=GK-1:GT=GT-1:CC=CC+1
1480 IF K(Z)="H"THENHK=HK-1:HT=HT-1:CC=CC+1
1490 IF K(Z)="I"THENIK=IK-1:IT=IT-1:CC=CC+1
1500 IF K(Z)="J"THENJK=JK-1:JT=JT-1:CC=CC+1
1510 NEXT Z
1520 IFAK>0ANDAT>0THEN 1530 ELSE 1540
1530 IFAK<=ATTHENCW=CW+AKELSECW=CW+AT
1540 IFBK>0ANDBT>0THEN 1550 ELSE 1560
1550 IFBK<=BTTHENCW=CW+BKELSECW=CW+BT
1560 IFCK>0ANDCT>0THEN 1570 ELSE 1580
1570 IFCK<=CTTHENCW=CW+CKELSECW=CW+CT
1580 IFDK>0ANDDT>0THEN 1590 ELSE 1600
1590 IFDK<=DTTHENCW=CW+DKELSECW=CW+DT
1600 IFEK>0ANDET>0THEN 1610 ELSE 1620
1610 IFEK<=ETTHENCW=CW+EKELSECW=CW+ET
1620 IFFK>0ANDFT>0THEN 1630 ELSE 1640
1630 IFFK<=FTTHENCW=CW+FKELSECW=CW+FT
1640 IFGK>0ANDGT>0THEN 1650 ELSE 1660
1650 IFGK<=GTTHENCW=CW+GKELSECW=CW+GT
1660 IFHK>0ANDHT>0THEN 1670 ELSE 1680
1670 IFHK<=HTTHENCW=CW+HKELSECW=CW+HT
1680 IFIK>0ANDIT>0THEN 1690 ELSE 1700
1690 IFIK<=ITTHENCW=CW+IKELSECW=CW+IT
1700 IFJK>0ANDJT>0THEN 1710 ELSE 1720
1710 IFJK<=JTTHENCW=CW+JKELSECW=CW+JT
1720              REM* PRESENT SCORE *
1730 IF CC=0 AND CW=0 AND G<>6 THEN GOSUB 1950 :GOTO 720
1740 IF CC=0 AND CW=0 AND G=6 THEN 2190
1750 IF G=1 THEN S(1)=899:S(2)=901:S(3)=903:S(4)=905
1760 IF G=2 THEN S(1)=771:S(2)=773:S(3)=775:S(4)=777
1770 IF G=3 THEN S(1)=643:S(2)=645:S(3)=647:S(4)=649
1780 IF G=4 THEN S(1)=515:S(2)=517:S(3)=519:S(4)=521
1790 IF G=5 THEN S(1)=387:S(2)=389:S(3)=391:S(4)=393
1800 IF G=6 THEN S(1)=259:S(2)=261:S(3)=263:S(4)=265
1810 W=CC
1820 IF CC=0 THEN 1870
1830 FOR Z=1 TO 4
1840 PRINT@S(Z),CHR$(143);:CC=CC-1
1850 IF CC=0 THEN 1870
1860 NEXTZ
1870 IF CW=0 THEN 1920
1880 FOR Z=4 TO 1 STEP -1
1890 PRINT@S(Z),CHR$(137);:CW=CW-1
1900 IF CW<=0 THEN 1920
1910 NEXT Z
1920 IF W=4 THEN 2030
1930 IF G=6 THEN 2190
1940 GOSUB 1950 : GOTO 1970
1950 W=0:CC=0:CW=0:AT=0:BT=0:CT=0:DT=0:ET=0:
FT=0:GT=0:HT=0:IT=0:JT=0:AK=0:BK=0:C
K=0:DK=0:EK=0:FK=0:GK=0:HK=0:IK=0:JK=0
1960 RETURN
1970 GOTO 720
1980              REM* RESIGNING *
1990 PRINT@286,"You have resigned.                 ";
2000 PRINT@414,"                                   ";
2010 GOTO 2240
2020              REM* WINNING *
2030 PRINT@286,"You have won! Congratulations.     ";
2040 Z=414
2050 IFG=1THENPRINT@Z,"That's incredible. The odds of   ";
2060 IF L=6 THEN O=1296
2070 IF L=8 THEN O=4096
2080 IF L=10 THENO=10000
2090 IF G=1THENPRINT@Z+64,"getting that correct were        ";
2100 IF G=1THENPRINT@Z+127,O;" to one. Go and see an ESP       ";
2110 IF G=1THENPRINT@Z+192,"specialist.                      ";
2120 IF G=2THENPRINT@Z,"Wow! That's really amazing.    ";
2130 IF G=3THENPRINT@Z,"You should go professional.    ";
2140 IF G=4THENPRINT@Z,"You're very good.              ";
2150 IF G=5THENPRINT@Z,"You're good.                   ";
2160 IF G=6THENPRINT@Z,"Phew! By the skin of your teeth. ";
2170 IFG<>1THENPRINT@Z+128,"                               ";
2180 GOTO 2240
2190            REM* LOSING *
2200 PRINT@286,"You have lost! Maybe better luck ";
2210 PRINT@350,"next time.";
2220 PRINT@414,"                              ";
2230            REM* GAME OVER *
2240 FOR X=60 TO 77:SET(X,6):NEXT X
2250 PRINT@94,"Game over";
2260 FOR X=139 TO 146:PRINT@X,CHR$(128);:NEXTX
2270 PRINT@147,CHR$(170);
2280 PRINT@140,K(1);:PRINT@142,K(2);:PRINT@144,K(3);:PRINT@146,K(4);
2290 FOR Z=0 TO 2000:NEXTZ
2300 PRINT@926,"Do you wish to play again (Y/N)?";
2310 Z$=INKEY$:IFZ$=""ORZ$<>"Y"ANDZ$<>"N"THEN 2310
2320 IF Z$="N"THENCLS:END
2330 G=0:GOSUB 1950 : CLS:GOTO 190
```

```
2340          REM* DATA FOR GRAPHICS DISPLAY *
2350 DATA4,21,5,21,6,20,6,21,6,22,6,23,6,24,6,25,6,26,5,27,4,27,3,28,2,28,1,28,0
,28,7,24,7,23,8,22,9,21,10,20,11,19,12,19,13,18,14,18,15,18,16,18,16,19,16,20,15
,21,15,22,14,23,14,24,13,25,16,21,17,20,18,19,19,18,20,17,21,17,22,16,23,16,24,1
5,25
2360 DATA15,26,15,27,16,26,17,25,18,24,19,24,20,23,21,23,22,23,23,24,23,25,22,26
,21,27,21,28,20,29,20,30,19,31,18,32,18,33,18,29,21,30,21,31,21,32,20,33,20,34,2
0,34,19,34,18,35,20,36,20,37,19,38,18,39,17,40,16,41,16,41,17,42,18,41,19,40,19,
39,19
2370 DATA43,17,44,16,45,15,46,14,46,13,47,12,47,11,48,10,45,17,46,17,47,17,48,16
,49,16,50,16,51,15,52,15,53,15,54,14,55,13,54,13,53,13,52,13,51,14,50,15,49,15,4
9,17,50,17,51,17,52,17,53,17,54,17,55,16,56,15,57,14,58,13,59,12,59,13,59,14,58,
15,58
2380 DATA16,60,13,61,12,62,12,63,12,64,11,65,11,66,11,67,11,68,11,69,10,45,13,47
,13,48,12,49,12,50,12,51,11,52,11,58,23,59,22,60,21,61,21,61,22,61,23,61,24,61,2
5,61,26,60,27,59,28,58,29,57,29,56,29,55,30,54,30,53,30,52,30,51,30,50,31,49,31,
48,31,47
2390 DATA31,62,24,63,23,64,22,65,21,66,21,67,20,68,20,69,20,69,21,69,22,69,23,69
,24,68,25,67,26,67,27,66,28,70,23,71,22,72,21,73,20,74,19,75,19,76,19,77,19,77,2
0,77,21,76,22,75,23,75,24,74,25,74,26,75,26,76,26,77,26,78,25,79,25,80,24,81,23,
82,22
2400 DATA82,23,82,24,82,25,83,25,84,24,85,23,86,23,87,22,88,22,89,21,90,21,90,22
,89,23,88,24,91,21,92,20,93,20,94,20,95,20,96,20,96,21,96,22,97,22,98,21,99,21,1
00,20,101,20,102,19,103,18,104,18,105,18,106,18,107,18,108,18,102,21,103,21,104,
21
2410 DATA105,20,106,19,107,19,108,17,109,16,109,15,110,14,108,19,109,19,110,19,1
11,19,112,18,113,18,114,18,115,18,116,17,117,17,118,17,119,17,120,16,121,16,122,
16,123,16,124,15,125,15,126,15,127,15,84,20
```

REACTION

BY J. STANTON

& J. WILKINSON

RUNS ON AN UNEXPANDED VIC-20

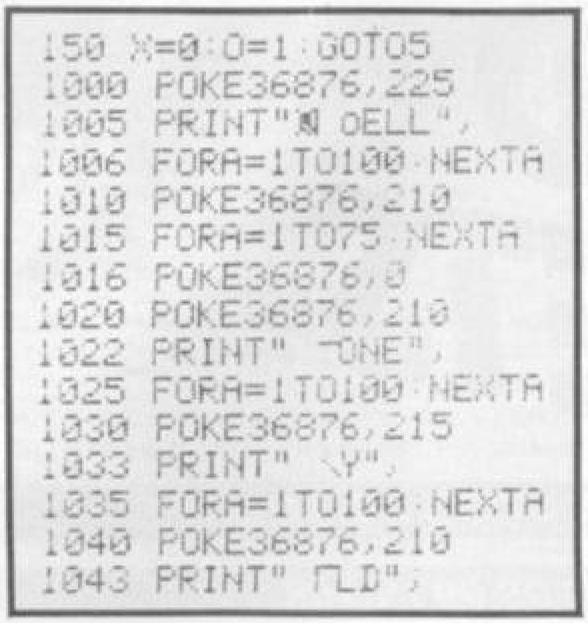
Want to hone your reactions for those games of Defender, Frogger — and of course, Pengo — down at your local arcade? Well here's the game that will test your mind to eye powers to the full.

The rules are simple. All you have to do is wait for a dot to appear on the screen, a noise from your computer and the screen colour to change. As soon as this happens you must the space bar.

Your reaction time is flashed up, and there is also a high score feature which you set with your first attempt.

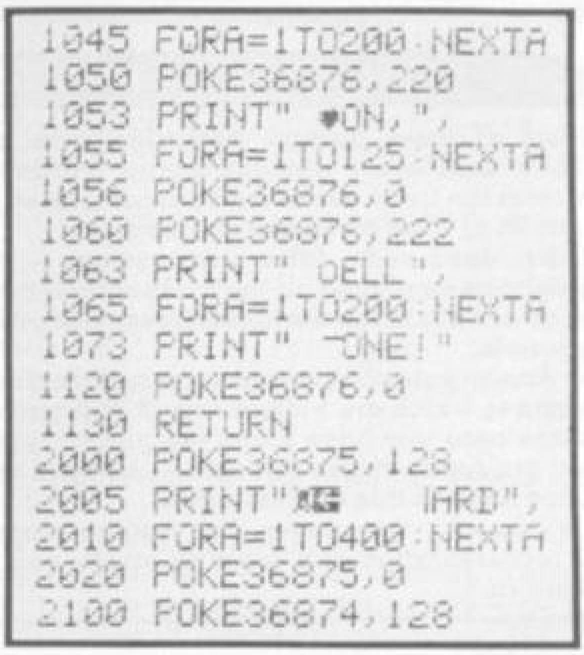
Further attempts receive comments from your computer and a suitable jingle. Instructions are included in the program which uses the Vic's sound, visual, and colour facilities to the full and should provide a good test to skill for any arcade fan willing to take a break from blasting multi-coloured aliens!

```
1 V=25:POKE36878,6:PRINTCHR$(14):POKE36879,27
2 GOTO5000
3 O=0
4 GOTO4000
5 PRINT"▯"
6 R=INT(RND(TI)*800)
7 G=INT(RND(TI)*400)+100
8 PRINT"▚IERE ╲T ¬OMES▦..":FORA=1TO1300:NEXTA:POKE36879,250
9 FORL=1TO400:IFPEEK(197)=32THENGOTO6000:NEXTL:PRINT"▯"
20 POKE7680+G,160
22 POKE36876,200
30 POKE38400+G,0
32 FORA=1TO50:NEXTA:POKE36876,0
35 F=TI
40 PRINT"▯"
50 IFPEEK(197)=32THENGOTO105
60 GOTO50
105 PRINT"▩▩▩▩▩▩▚_EACTION ▏IME:"
106 X=(TI-F)/60
110 PRINT"▩▩▩▩▩";X;" ♥EC."
120 IFO=1ANDX<=VTHENGOSUB1000
125 IFO=1ANDX>VTHENGOSUB2000
126 IFX<VTHENV=X
130 PRINT"▩▩▩▩▩▦_ASTEST ▏IME:"
135 PRINT"▩▩▩▩▩"V;" ♥EC."
140 FORI=1TO2000:POKE36879,27:NEXTI
```



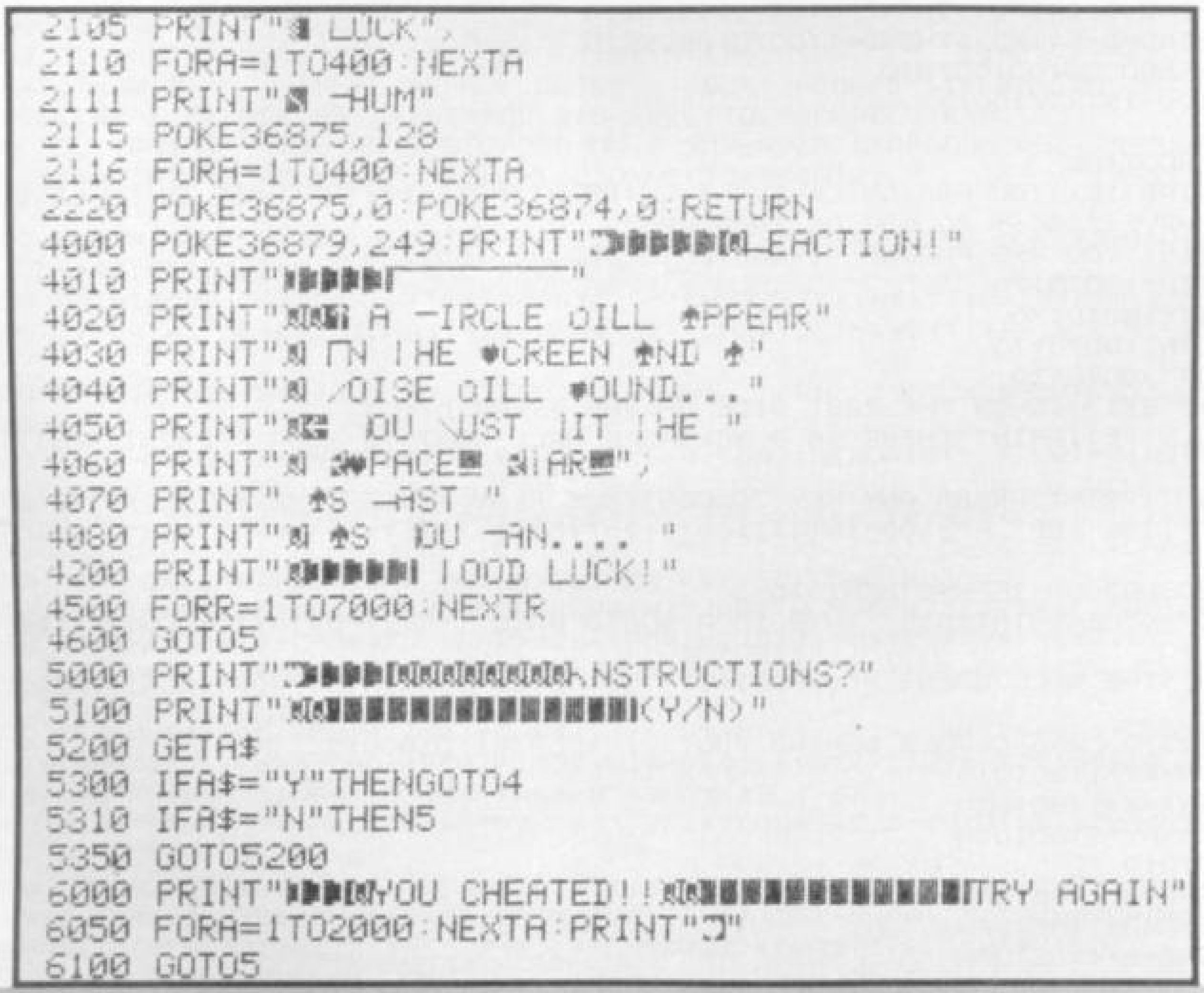
```
150 X=0:O=1:GOTO5
1000 POKE36876,225
1005 PRINT"▧ OELL",
1006 FORA=1TO100:NEXTA
1010 POKE36876,210
1015 FORA=1TO75:NEXTA
1016 POKE36876,0
1020 POKE36876,210
1022 PRINT" ⌐ONE",
1025 FORA=1TO100:NEXTA
1030 POKE36876,215
1033 PRINT" \Y",
1035 FORA=1TO100:NEXTA
1040 POKE36876,210
1043 PRINT" ΓLD";
```

REACTION



```
1045 FORA=1TO200:NEXTA
1050 POKE36876,220
1053 PRINT" ♥ON,",
1055 FORA=1TO125:NEXTA
1056 POKE36876,0
1060 POKE36876,222
1063 PRINT" OELL",
1065 FORA=1TO200:NEXTA
1073 PRINT" ⌐ONE!"
1120 POKE36876,0
1130 RETURN
2000 POKE36875,128
2005 PRINT"▧▩ IARD",
2010 FORA=1TO400:NEXTA
2020 POKE36875,0
2100 POKE36874,128
```

REACTION



```
2105 PRINT"▩ LUCK",
2110 FORA=1TO400:NEXTA
2111 PRINT"▧ ⌐HUM"
2115 POKE36875,128
2116 FORA=1TO400:NEXTA
2220 POKE36875,0:POKE36874,0:RETURN
4000 POKE36879,249:PRINT"⊐▶▶▶▶▶▧_EACTION!"
4010 PRINT"▶▶▶▶▶Γ‾‾‾‾‾‾‾‾‾‾‾‾‾‾"
4020 PRINT"▧▧▩ A -IRCLE OILL ♠PPEAR"
4030 PRINT"▧ ΓN IHE ♥CREEN ♠ND ♠'
4040 PRINT"▧ /OISE OILL ♥OUND..."
4050 PRINT"▧▩ IOU \UST IIT IHE "
4060 PRINT"▧ ▩♥PACE▩ ▩IAR▩";
4070 PRINT" ♠S ⌐AST "
4080 PRINT"▧ ♠S IOU ⌐AN.... "
4200 PRINT"▧▶▶▶▶▶ IOOD LUCK!"
4500 FORR=1TO7000:NEXTR
4600 GOTO5
5000 PRINT"⊐▶▶▶▧▧▧▧▧▧▧ΛNSTRUCTIONS?"
5100 PRINT"▧▧▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶(Y/N)"
5200 GETA$
5300 IFA$="Y"THENGOTO4
5310 IFA$="N"THEN5
5350 GOTO5200
6000 PRINT"▶▶▶▧YOU CHEATED!!▧▧▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶TRY AGAIN"
6050 FORA=1TO2000:NEXTA:PRINT"⊐"
6100 GOTO5
```

PYRAMID OF SECRETS

BY STEVE HOLLOWAY

RUNS ON A TRS-80 IN 16K

The builders of those ancient pyramids were crafty people. They used every devious means available to them to protect the treasures of the Pharoah buried deep with the vaults of their awesome creation.

Trap doors, dead ends, false passageways – these ancient architects employed all the tricks of their trade to make sure no-one could rob the tombs lined with gold and glittering jewels.

Will you dare to enter the pyramid of secrets and search for the treasures which are hidden there? Will you manage to escape once you have found the glittering prize? Or will you gradually starve to death – trapped within the stone corridors of this ancient maze . . .

This is a game for one player. You will be presented with a 3D representation of a maze in which you must move around in.

There are six levels to explore in search of the treasure. But beware of trap doors – and walls that may look solid, but which may slide open if you move forward into them. The trap doors will drop you back to a lower level – and the entrance to the pyramid is one of those moving blocks of stone and may be difficult to find again. There is also a time limit on the game – after it has run out you are presumed dead.

Program notes:

10-80: Input routine and timer advance

100-200: Help routine: gives player's direction, level, treasure and indicates if a moveable wall is nearby

500-530: Solid wall message and open wall routine.

1020-1050: Move player forward.

3000-3020: Routine for finding walls present and whether stairs, trapdoor, treasure.

```
5 GOTO 6000
10 GOSUB3030:PRINT@0,"WHICH WAY? (F,L,R,H) :-";:PRINT@48,"TIME LEFT -";
20 I$=INKEY$:PRINT@25,I$;:T=T+1:IFT>10000THENCLS:PRINT@520,"SORRY - BUT YOU RAN
OUT OF TIME AND STARVED TO DEATH.":END
30 IFI$="F"GOTO500
40 IFI$="L"THEND=D-1:IFD<1THEND=4:GOTO10ELSE10
50 IFI$="R"THEND=D+1:IFD>4THEND=1:GOTO10ELSE10
60 IFI$="H"THENGOSUB100:GOTO10
70 PRINT@59,100-INT(T/100);
80 GOTO20
100 REM HELP ROUTINE
110 CLS:PRINTTAB(10)"YOU ARE ON LEVEL -";LV:PRINTTAB(10)"(THE EXIT IS ON LEVEL 3
)":PRINT"YOU HAVE ";SC;" POUNDS OF TREASURE"
120 PRINTTAB(10)"YOU ARE FACING ";:OND GOTO130,140,150,160
130 PRINT"NORTH":GOTO170
140 PRINT"EAST":GOTO170
150 PRINT"SOUTH":GOTO170
160 PRINT"WEST":GOTO170
170 PRINT"(THE EXIT IS ON THE EAST SIDE OF THE PYRAMID)"
180 IF A(X,Y,LV)>511PRINT"THERE IS A MOVEABLE WALL NEXT TO YOUR PRESENT POSITION
"
190 PRINT:PRINT:PRINT"PRESS ANY KEY TO CONTINUE PLAY (NOTE TIME IS SLIPPING BY)"
200 PRINT@48,"TIME LEFT -";100-INT(T/100);:T=T+5:I$=INKEY$:IFI$=""THEN 200 ELSE
RETURN
500 A=X:B=Y:GOSUB3000:IFFW=0THEN1020
510 IFFW>0ANDF=0THENPRINT@530,"THIS IS A SOLID WALL !!!";:FORI=1TO1000:NEXTI:PRI
NT@530,"                            ";:GOTO20
520 PRINT@530,"THE WALL OPENS -";:FORI=179TO160STEP-1:PRINT@I,VO$;:FORJ=1TO50:NE
XTJ:NEXTI
530 CLS:PRINT@530,"AND CLOSES BEHIND YOU....":FORI=1TO1000:NEXT
1020 IFD=1THENY=Y-1:GOTO10
1030 IFD=2THENX=X+1:GOTO10
1040 IFD=3THENY=Y+1:GOTO10
1050 X=X-1:GOTO10
1060 IFD=1THENB=B-1:RETURN
1070 IFD=2THENA=A+1:RETURN
1080 IFD=3THENB=B+1:RETURN
```

```
1090 A=A-1:RETURN
3000 NW=A(A,B,LV)AND2:WW=A(A,B,LV)AND1:EW=A(A,B,LV)AND4:SW=A(A,B,LV)AND8:FW=NW:R
W=EW:LW=WW:BW=SW:ST=A(A,B,LV)AND96:TR=A(A,B,LV)AND16:PI=A(A,B,LV)AND128:IFD=1THE
N3020
3010 FORI=1TOD-1:Z=FW:FW=RW:RW=BW:BW=LW:LW=Z:NEXTI
3020 F=A(X,Y,LV)AND(FW*512):RETURN
3030 IFA(X,Y,LV)=769THEN5500ELSEA=X:B=Y:GOSUB3000:IFPI)0ANDRND(9)=4THENGOSUB5600
:GOTO10
3040 IFST=64THENCLS:LV=LV-1:PRINT@520,"GOING UP STAIRS":GOSUB7050:GOTO1020ELSEIF
ST=32THENCLS:LV=LV+1:PRINT@520,"GOING DOWNSTAIRS":GOSUB7050:GOTO1020
3050 IFTR)0THENSC=SC+RND(10)*10:CLS:PRINT@520,"YOU HAVE COLLECTED MORE RARE TREA
SURES,
YOU NOW HAVE";SC;"POUNDS":A(X,Y,LV)=A(X,Y,LV)-16:GOSUB7050:GOTO10
3060 CLS:PRINT@141,V0$;:PRINT@179,V0$;:IFLW)0PRINT@74,XA$;:PRINT@970,XB$;ELSEPRI
NT@129,W3$;:PRINT@897,W4$;
3070 IFRW)0PRINT@116,XB$;:PRINT@1012,XA$;ELSEPRINT@180,W3$;:PRINT@948,W4$;
3080 IFFW)0PRINT@142,W1$;:PRINT@910,W2$;:RETURN
3090 GOSUB1060:GOSUB3000
3100 IFST=32PRINT@540,S1$;:RETURNELSEIFST=64PRINT@540,S2$;:RETURN
3110 IFLW)0PRINT@142,XC$;:PRINT@910,XE$;ELSEPRINT@334,W7$;:PRINT@718,W8$;
3120 IFRW)0PRINT@299,XD$;:PRINT@811,XF$;ELSEPRINT@363,W7$;:PRINT@747,W8$;
3130 IFTR)0PRINT@861,TR$;
3150 PRINT@342,V1$;:PRINT@362,V1$;:IFFW)0THENPRINT@343,W5$;:PRINT@727,W6$;:RETUR
N
3160 GOSUB1060:GOSUB3000:
3170 IFST=32THENPRINT@540,S1$;:RETURNELSEIFST=64PRINT@540,S2$;:RETURN
3180 IFLW)0PRINT@343,XG$;:PRINT@727,XH$;ELSEPRINT@407,WA$;:PRINT@663,WA$;
3190 IFRW)0PRINT@423,XI$;:PRINT@679,XJ$;ELSEPRINT@423,WA$;:PRINT@679,WA$;
3200 PRINT@410,V3$;:PRINT@422,V3$;:IFTR)0PRINT@733,TR$;
3210 IFFW)0PRINT@411,W9$;:PRINT@667,W9$;:RETURN
3220 GOSUB1060:GOSUB3000:IFST=32PRINT@540,S1$;:RETURNELSEIFST=64PRINT@540,S2$;:R
ETURN
3230 IFLW)0PRINT@411,CHR$(176);CHR$(26);CHR$(131);:PRINT@667,CHR$(131);CHR$(27);
CHR$(176);ELSEPRINT@475,CHR$(140);CHR$(140);:PRINT@603,CHR$(140);CHR$(140);
3240 IFRW)0PRINT@484,CHR$(131);CHR$(27);CHR$(176);:PRINT@612,CHR$(176);CHR$(26);
CHR$(131);ELSEPRINT@484,CHR$(140);CHR$(140);:PRINT@612,CHR$(140);CHR$(140);
3260 PRINT@477,CHR$(188);CHR$(24);CHR$(26);V$;CHR$(143);:PRINT@483,CHR$(188);CHR
$(24);CHR$(26);V$;CHR$(143);
3270 IFFW)0PRINT@478,STRING$(5,140);:PRINT@606,STRING$(5,140);:RETURNELSEPRINT@4
78,CHR$(176);CHR$(26);CHR$(179);CHR$(32);CHR$(179);CHR$(27);CHR$(176);:PRINT@606
,CHR$(131);:PRINT@610,CHR$(131);:RETURN
4000 RETURN
5500 CLS:PRINT@520,"YOU ARE OUT !":PRINT:PRINT"      TIME LEFT";32-INT(T/1000):
PRINT:PRINT"    TREASURE COLLECTED -";SC;" POUNDS":IF SC)200 PRINT"   TRULY
EXCELLENT !!":ENDELSE PRINT"YOU DID WELL TO ESCAPE.":END
5600 CLS:PRINT"  YOU HAVE STEPPED ON A MOVEABLE TRAPDOOR AND ARE":FORI=154TO1020
STEP64:PRINT@I,"FALLING";:FORJ=1TO30:NEXTJ:PRINT@I,"       ":NEXTI:LV=LV+1:RETU
RN
6000 CLEAR 900:DEFINTA-Z:DIMA(11,11,6):CLS:PRINT@282,"T H E":PRINT@406,"P Y R A
M I D":PRINT@532,"O F  S E C R E T S"
6010 PRINT@588,"";:FORI=1TO8:PRINT"/ ";CHR$(27);:NEXTI:PRINT"/";CHR$(92);" ";CHR
$(26);:FORI=1TO8:PRINTCHR$(92);CHR$(32);CHR$(26);:NEXTI:PRINT@640,STRING$(64,"-"
)
6020 PRINT@780,"WRITTEN BY STEVE HOLLOWAY,  FEB  1982":LV=5:A(6,5,1)=23:A(9,6,3)
=769
6030 N1=7-LV:N2=12-N1:FORX=N1TON2:FORY=N1TON2:READA:A(X,Y,LV)=A:NEXTY:NEXTX:LV=L
V-1:IFLV)0THEN6030
6040 W1$=STRING$(37,131):W2$=STRING$(37,176):W3$=STRING$(12,131):W4$=STRING$(12,
176):XA$=CHR$(131)+CHR$(140)+CHR$(176):XB$=CHR$(176)+CHR$(140)+CHR$(131):PRINT"P
RESS 'I' FOR INSTRUCTIONS OR ANY OTHER KEY TO CONTINUE"
6050 I$=INKEY$:IFI$=""THEN6050ELSEPRINT"JUST A MOMENT":IFI$="I"GOSUB8000
6060 V$=CHR$(191)+CHR$(26)+CHR$(24):FORI=1TO13:V0$=V0$+V$:NEXTI:XC$=CHR$(140)+CH
R$(176)+CHR$(26)+XA$+CHR$(26)+XA$:XD$=XB$+CHR$(27)+XB$+CHR$(27)+CHR$(176)+CHR$(1
40)
6070 XE$=CHR$(140)+CHR$(131)+CHR$(27)+XB$+CHR$(27)+XB$:XF$=XA$+CHR$(26)+XA$+CHR$
(26)+CHR$(131)+CHR$(140):FORI=1TO7:V1$=V1$+V$:NEXTI:W7$=STRING$(8,131):W8$=STRIN
G$(8,176):W5$=STRING$(19,131):W6$=STRING$(19,176)
6080 S1$="STAIRS"+CHR$(26)+STRING$(5,24)+"DOWN":S2$="STAIRS"+CHR$(26)+STRING$(4,
24)+"UP":TR$="TREASURE"
6090 W9$=STRING$(11,140):WA$=STRING$(3,140):V3$=CHR$(188)+CHR$(26)+CHR$(24)+V$+V
$+V$+CHR$(143):XG$=CHR$(140)+CHR$(176)+CHR$(26)+CHR$(131):XH$=CHR$(140)+CHR$(131
)+CHR$(27)+CHR$(176):XI$=CHR$(131)+CHR$(27)+CHR$(176)+CHR$(140)
```

```
6100 XJ$=CHR$(176)+CHR$(26)+CHR$(131)+CHR$(140)
6110 FORI=1TO11:FORJ=1TO11:READA:A(I,J,6)=A:NEXTJ:NEXTI
6120 PRINTTAB(8)"PRESS (F) TO OPEN ENTRANCE AND START EXPLORING"
6980 D=4:X=9:Y=6:LV=3:SC=0:T=0
6990 I$=INKEY$:IFI$="F"THENCLS:GOTO520ELSE6990
7000 DATA3,5,1,5,5,5,9,3,9,2,13,2,5,5,9,14,64,10,14,64,10,3,13,2,9,3,8,3,12,2,12
,7,8,10,10,10,2,5,8,3,29,10,6,12,14,10,11,14,2,5,12,3,1,9,10,6,1,8,3,1,12,10,10,
2,29,14,10,32,10,2063,10,10,6,5,13,6,5,12,519,12,32
7010 DATA19,133,5,5,2053,13,32,32,3,5,9,515,5,12,3,8,7,12,10,64,9,10,6,5,5,4,5,8
,6,1,5,13,7,5,8,11,2062,64,1,13,11,10,6,517,5,4,5,140,14
7020 DATA3,1,5,133,13,10,6,9,64,32,6,137,2,133,9,3,12,2,141,10,6,32,2062,6,12,3,
5,32,10,64,9,6,5,140,32
7030 DATA7,9,23,5,5,5,1,1,5,5,9,27,6,9,7,5,9,14,10,11,7,8,10,11,6,5,9,2,5,8,2,29
,10,10,2,1,4109,1034,10,27,10,6,5,8,10,10,10,3,12,10,6,12,3,5,12,6,12,10,10,7,0,
5,9,14,3,9
7040 DATA3,5,8,6,5,12,11,6,5,12,10,10,7,4,5,1,13,6,1,5,5,12,6,5,9,3,12,64,7,4,1,
5,9,3,29,10,2,5,12,3,29,10,64,10,6,5,12,6,5,13,6,5,12,6,12
7050 FORI=1TO1000:NEXTI:CLS:RETURN
8000 CLS:PRINTTAB(10)"P Y R A M I D   O F   S E C R E T S":PRINT:PRINT"YOU ARE O
UTSIDE THE ENTRANCE OF THE PYRAMID. IN A MOMENT YOU
CAN ENTER AND FIND YOUR WAY AROUND."
8010 PRINT"THERE ARE TEN TREASURES TO FIND AND MINOR HAZARDS TO AVOID
THERE ARE SOME TRAPS IN THE FLOOR WHICH WILL DROP YOU TO THE     LEVEL BELOW SOME
TIMES AND THERE ARE WALLS WHICH LOOK SOLID BUT"
8020 PRINT"WHICH WILL ALLOW YOU THROUGH IF YOU MOVE FOREWARD INTO THEM. YOU CONT
ROL YOUR WAY THROUGH THE PYRAMID USING -
      (F) FOR FOREWARD,  (R) TO TURN RIGHT,  (L) TO TURN LEFT
  (H) WILL TELL YOU THE LEVEL YOU ARE ON AND
8030 PRINT"THE DIRECTION YOU ARE FACING BUT REDUCE YOUR TIME.
YOUR TIME IS LIMITED SO DON'T TAKE TOO LONG PONDERING !":RETURN
```

SSSNAKES

BY STEVEN JERATH

RUNS ON AN ATARI 400 IN 16K

Are you a slippery customer? Then here's your chance to prove it. The aim of this two player game is to trap your opponent in the coils of your snake while at the same time avoiding getting trapped yourself.

You cannot go back on yourself or touch your own line. You must not touch your opponent's line. Also you have to stay away from the stars which dot the screen -- and of course you must stay away from the walls.

```
5 GOSUB 2000
10 GRAPHICS 7+16:V1=0:V2=0:H1=1:H2=-1
11 SETCOLOR 2,7,8
13 FOR AAA=1 TO 20:COLOR 3:PLOT INT(RND(
0)*160),INT(RND(0)*96):NEXT AAA
20 X1=10:Y1=40:X2=140:Y2=40
29 COLOR 3:PLOT 0,0:DRAWTO 159,0:DRAWTO
159,95:DRAWTO 0,95:DRAWTO 0,0
30 A=STICK(0)
31 B=STICK(1)
50 IF A=14 THEN V1=-1:H1=0
51 IF A=13 THEN V1=1:H1=0
52 IF A=11 THEN V1=0:H1=-1
53 IF A=7 THEN V1=0:H1=1
60 IF B=14 THEN V2=-1:H2=0
61 IF B=13 THEN V2=1:H2=0
62 IF B=11 THEN V2=0:H2=-1
63 IF B=7 THEN V2=0:H2=1
70 X1=X1+H1:Y1=Y1+V1
80 X2=X2+H2:Y2=Y2+V2
81 IF X1=X2 AND Y1=Y2 THEN 300
85 LOCATE X1,Y1,ZZ:IF ZZ<>0 THEN 100
86 LOCATE X2,Y2,ZZ:IF ZZ<>0 THEN 200
90 COLOR 1:PLOT X1,Y1
91 COLOR 2:PLOT X2,Y2
92 POKE 53279,0
95 GOTO 30
100 GRAPHICS 1+16
101 POKE (PEEK(560)+256*PEEK(561))+3,64+
7:SETCOLOR 2,7,10
```

```
102 ? #6;"   PLAYER 1 LOSES"
103 R2=R2+1:IF R2>9 THEN 500
104 ? #6:? #6:? #6;"            SCORES"
105 ? #6;"      player 1-";R1:? #6;"
player 2-";R2
150 FOR S=0 TO 250:SOUND 0,S,10,10:NEXT
S:SOUND 0,0,0,0
190 ? #6:? #6:? #6;"      hit any key "
199 GET #1,K:GOTO 10
200 GRAPHICS 1+16
201 POKE (PEEK(560)+256*PEEK(561))+3,64+
7:SETCOLOR 2,7,10
202 ? #6;"   PLAYER 2 LOSES"
203 R1=R1+1:IF R1>9 THEN 600
204 ? #6:? #6:? #6;"            SCORES"
205 ? #6;"      player 1-";R1:? #6;"
player 2-";R2
250 FOR S=0 TO 250:SOUND 0,S,10,10:NEXT
S:SOUND 0,0,0,0
290 ? #6:? #6:? #6;"      hit any key "
299 GET #1,K:GOTO 10
300 GRAPHICS 1+16
301 POKE (PEEK(560)+256*PEEK(561))+3,64+
7:SETCOLOR 2,7,10
302 ? #6;"  you both lost!!!"
303 ? #6:? #6:? #6;"      unlucky!!!!"
304 FOR S=0 TO 20:FOR W=0 TO 10:SOUND 0,
S*10,10,4:SOUND 0,0,0,0:NEXT W:NEXT S
310 GOTO 190
500 GRAPHICS 1+16
501 POKE (PEEK(560)+256*PEEK(561))+3.64+
7:SETCOLOR 2,7,10
502 ? #6;"  PLAYER NO.2 WINS"
503 FOR ZZZ=0 TO 100:FOR W=0 TO 20:NEXT
W:SOUND 0,ZZZ,10,4:NEXT ZZZ
504 SOUND 0,0,0,0
510 GOTO 610
600 GRAPHICS 1+16
601 POKE (PEEK(560)+256*PEEK(561))+3,64+
7:SETCOLOR 2,7,10
602 ? #6;"  PLAYER NO.1 WINS"
603 FOR ZZZ=0 TO 100:FOR W=0 TO 20:NEXT
W:SOUND 0,ZZZ,10,4:NEXT ZZZ
604 SOUND 0,0,0,0
610 ? #6:? #6:? #6:? #6:? #6
620 ? #6;"  hit any key for"
630 ? #6;"   another game"
640 GET #1,K:RUN
1000 FOR W=0 TO 500:NEXT W
```

```
1001 RETURN
2000 OPEN #1,4,0,"K"
2001 GRAPHICS 1+16
2002 POKE (PEEK(560)+256*PEEK(561))+3,64
+7
2003 ? #6;"        snakes"
2004 SETCOLOR 2,0,14
2010 ? #6:? #6:? #6
2020 ? #6;"  IN THIS 2 PLAYER"
2021 ? #6;"  GAME EACH PLAYER"
2022 ? #6;" TRIES TO AVOID THE"
2023 ? #6;"     OTHERS TRAIL"
2024 ? #6;" USING THE JOYSTICK"
2025 ? #6:? #6:? #6;"hit any key to begi
n"
2026 GET #1,K
2030 RETURN
9999 GOTO 9999
```

RED ALERT

BY SIMON PARKER

RUNS ON A VIC-20

IN 16K

Got tunnel vision? Then this game is the one for you! Zapping through narrow tunnels is a task some arcade video freaks just love. And here's a program that will save a few of those precious 10p's.

It's based on arcade Scramble — the game that you either love or hate. For those of you who have yet to come across the game — and you must be few and far between here's a rundown on what you have to do. The idea is to pilot a spacecraft over the ever changing landscape of an alien cavern, dotted with fuel dumps. You must avoid the walls of the cavern and the spaceships which advance against you. You bomb the fuel dumps and shot down the ships — it's as simple as that!

The program is written mainly in basic apart from a small machine code routine in subroutine 5000. This is used to pull the screen from right to left. The game can be controlled using either the keyboard or a joystick.

```
0 REM**RED ALERT**
1 REM**BY SIMON PARKER**
2 REM**27/6/1982
5 P=7904
6 J=5:G=5:CC=.5:DD=.9
7 GOSUB1000:GOSUB5000
8 TI$="000000"
10 PRINT"⊐≡"
20 POKE36879,143:POKE36878,15
30 B=RND(1)
31 IFTI$="000200"THENPOKE36879,8:CC=.65:DD=.8
32 IFTI$="000330"THENPOKE36879,57:CC =.75:DD=.7
35 C=RND(1)
36 IFB<CCTHENJ=J+1:GOTO40
37 J=J-1
40 IFC<CCTHENG=G+1:GOTO46
45 G=G-1
46 IFJ>10ANDG>10THENG=G-1:J=J-1
47 IFJ+G>17THENJ=J-1:G=G-1
48 IFJ<1THENJ=1
49 IFG<1THENG=1
50 FORK=1TOJ
60 POKE8185-22*K,20
61 NEXTK:IFB<.2ORB>.8THENPOKE8185-22*K,22:POKE81
85+30720-22*K,2
62 FORK=1TOG
65 POKE7701+22*K,20
66 NEXTK
70 IFC>DDTHENPOKE7701+22*K+44,24:POKE38421+22*K+44,2
91 POKEP,32
100 SYS(829)
125 POKEP,21:POKEP-1,32
126 PRINT"▓▓SCORE■"SC
130 POKEP,32
135 L2=PEEK(197):P2=PEEK(653)
140 L=PEEK(37137):POKE37154,127:P1=PEEK(37152):POKE37154,255
143 IFL=30ANDP1=119ORP2=1ANDL2=14THENGOSUB4000:GOTO181
145 IFL=30ORP2=1THENSC=SC-50:GOSUB3000:GOTO181
150 IFL=54ORL2=22THENP=P+22
160 IFL=46ORL2=13THENP=P-1
170 IFL=58ORL2=53THENP=P-22
180 IFP1=119ORL2=14THENP=P+1
181 IFPEEK(P+1)<>32THENGOTO2000
190 POKEP,21:POKEP-1,32:POKE36877,120+INT((P-7680)/4)
200 GOTO30
1000 POKE52,28:POKE56,28
```

```
1010 FORI=7168TO7679:POKEI,PEEK(I+25600):NEXT
1030 FORC=7328TO7367:READA:POKEC,A:NEXT
1035 POKE36869,255:RETURN
1040 DATA170,85,170,85,170,85,170,85
1050 DATA0,128,192,224,254,255,255,0
1060 DATA60,60,126,126,255,60,66,129
1070 DATA160,80,168,75,168,80,160,0
1080 DATA0,1,3,7,127,255,255,0
2000 FORI=1TO10
2010 POKE36879,I*10
2011 POKE36878,10-I
2012 POKE36877,220
2020 FORK=1TO200:NEXTK
2030 NEXTI
2040 FORL=1TO1000:NEXTL
2045 POKE36869,240:PRINT"J"
2050 PRINT"■■■GAME OVER■"
2060 PRINT"■■YOU SCORED"SC
2070 PRINT"■■ANOTHER GAME (Y/N)"
2080 GETA$:IFA$=""THEN2080
2081 IFA$="Y"THENJ=8:G=8:P=7904:SC=0:TI$="000000":POKE36869,255:GOTO10
2082 IFA$="N"THENPRINT"J":POKE36869,240:END
2090 GOTO2080
3000 FORM=1TO10
3005 POKEN,32
3010 N=P+M*22:POKE36876,150+M*10
3020 IFPEEK(N)=22THENSC=SC+250:POKEN,42:POKE36876,0: RETURN
3030 IFPEEK(N)=20THENPOKEN,42:POKE36876,0:RETURN
3040 POKEN,90:NEXTM:POKEN,32:POKE36876,0:RETURN
4000 SC=SC-100:FORB=1TO10:POKEM1,32:M1=P+B:POKE36876,240:POKE36876,0
4010 IFPEEK(M1)=20THENPOKEMI,20:RETURN
4011 IFPEEK(M1)=22THENSC=SC+200:POKEMI,32:RETURN
4012 IFPEEK(M1)=24THENSC=SC+150:POKEM1,32:RETURN
4020 POKEM1,42:POKEM1+30720,1
4030 NEXTB:POKEM1,32:RETURN
5000 FORK=829TO874:READS:POKEK,S:NEXTK:RETURN
5010 DATA169,19,32,210,255,169,29,32,210,255,169,13,32,210,255,169,0,141,60,3
5020 DATA169,29,32,210,255,169,20,32,210,255,169,13,32,210,255,238,60,3,173,60,
3
5030 DATA201,21,208,231,96
5040 RETURN
```

MAGIC SQUARE

BY M. LEVIN

RUNS ON AN ATOM IN 16K

Warning. This game can impair your sanity.

Written in machine code for an Atom with at least 3K of RAM this program seems designed to either increase your reasoning power or destroy what little sanity you may have left.

You are given a nine square grid with a random number of these squares illuminated. By pressing any of the numeric keys within the range of 1-9, different combination of these squares may be obtained.

The final object being to light up all the squares except the centre one. Should you manage this task you are rewarded by a dizzying display of sight and sound. small consolation for shattered nerves.

```
10DIMKK8,WW2
20P.$12"WAIT"$21
30GOS.a;GOS.a;GOS.a
40!#300=#BF00BFBF;!#304=#000000BF;?#308=#00
50!#310=#00BFBFBF;!#314=#00000000;?#318=#00
60!#320=#00BFBF00;!#324=#0000BFBF;?#328=#00
70!#330=#BF0000BF;!#334=#00BF0000;?#338=#00
80!#340=#BF00BF00;!#344=#BF00BFBF;?#348=#00
90!#350=#00BF0000;!#354=#0000BF00;?#358=#BF
100!#360=#BF000000;!#364=#BFBF00BF;?#368=#00
110!#370=#00000000;!#374=#BFBF0000;?#378=#BF
120!#380=#00000000;!#384=#BF00BFBF;?#388=#BF;CLEAR0
130IFR.%2=0;?#80A7=#FF;IFR.%2=0;?#80AB=#FF;IFR.%2=0;?#80AF=#FF
140IFR.%2=0;?#8107=#FF;IFR.%2=0;?#810B=#FF;IFR.%2=0;?#810F=#FF
150IFR.%2=0;?#8167=#FF;IFR.%2=0;?#816B=#FF;IFR.%2=0;?#816F=#FF
160!#DE=#8025;P."magic"$128"square"
170MOVE18,9;DRAW18,35;MOVE27,9;DRAW27,35;MOVE10,18;DRAW35,18
180MOVE10,26;DRAW35,26
190 LINK #3300
195 RUN
200 END
210a P=#3300
220[:KK0 JSR#FFE3 \ GET KEY
230 CMP@#31;BMI KK0
240 CMP@#40;BPL KK0
250 AND@#0F
260 ROL A;ROL A
270 ROL A;ROL A
280 STA#80
290 SEC;SBC@#10
300 TAX
310 LDY@9
320 LDA#80A7
\ COMPLIMENT
330 EOR#300,X
340 STA#80A7
350 INX
360 LDA#80AB
370 EOR#300,X
380 STA#80AB
390 INX
400 LDA#80AF
410 EOR#300,X
420 STA#80AF
430 INX
440 LDA#8107
450 EOR#300,X
460 STA#8107
470 INX
480 LDA#810B
490 EOR#300,X
500 STA#810B
510 INX
520 LDA#810F
530 EOR#300,X
540 STA#810F
550 INX
560 LDA#8167
570 EOR#300,X
580 STA#8167
590 INX
600 LDA#816B
610 EOR#300,X
620 STA#816B
630 INX
640 LDA#816F
650 EOR#300,X
660 STA#816F
670 BCS KK2
680:KK1 JMP KK0
690 :KK2 LDY@#AA
\ BLEEP
700 LDA#B002
710:KK3 LDX#80
720:KK4 DEX;BNE KK4
730 EOR@4
740 STA#B002
750 DEY
760 BNE KK3
770 LDA#80A7
\ WIN CHECK
780 CMP@#FF
790 BNE KK1
800 LDA#80AB
810 CMP@#FF
820 BNE KK1
830 LDA#80AF
840 CMP@#FF
850 BNE KK1
860 LDA#8107
870 CMP@#FF
880 BNE KK1
890 LDA#810B
900 CMP@#40
910 BNE KK1
920 LDA#810F
930 CMP@#FF
940 BNE KK1
950 LDA#8167
960 CMP@#FF
970 BNE KK1
980 LDA#816B
990 CMP@#FF
1000 BNE KK1
1010 LDA#816F
1020 CMP@#FF
1030 BNE KK1
1050 LDA@8;STA#40
;BCSKK5
1051:WW0 LDX@#90
\BLEEP
1052:WW1 TXA;TAY
1053 LDA#B002
1054 EOR@4
1055 STA#B002
1056:WW2 DEY;BNE WW2
1057 DEX;BNE WW1
1058 RTS
1060:KK5 LDA#80A7
\ DISPLAY WIN
1070 EOR@#BF
1080 STA#80A7
1090 JSR WW0
1100 LDA#80AB
1110 EOR@#BF
1120 STA#80AB
1130 JSR WW0
1140 LDA#80AF
1150 EOR@#BF
1160 STA#80AF
1170 JSR WW0
1180 LDA#810F
1190 EOR@#BF
1200 STA#810F
1210 JSR WW0
1220 LDA#816F
1230 EOR@#BF
1240 STA#816F
1250 JSR WW0
1260 LDA#816B
1270 EOR@#BF
1280 STA#816B
1290 JSR WW0
1300 LDA#8167
1310 EOR@#BF
1320 STA#8167
1330 JSR WW0
1340 LDA#8107
1350 EOR@#BF
1360 STA#8107
1370 JSR WW0
1380 DEC#40;BNE KK5
1390 RTS
1480]
1490 RETURN
```

BREAK^O^UT!

Ever feel like you're just banging your head up against a brick wall? Do you want to break out? Well, here's your chance. Simply program in this little number and you'll be able to knock down walls as quick as your computer can build them.

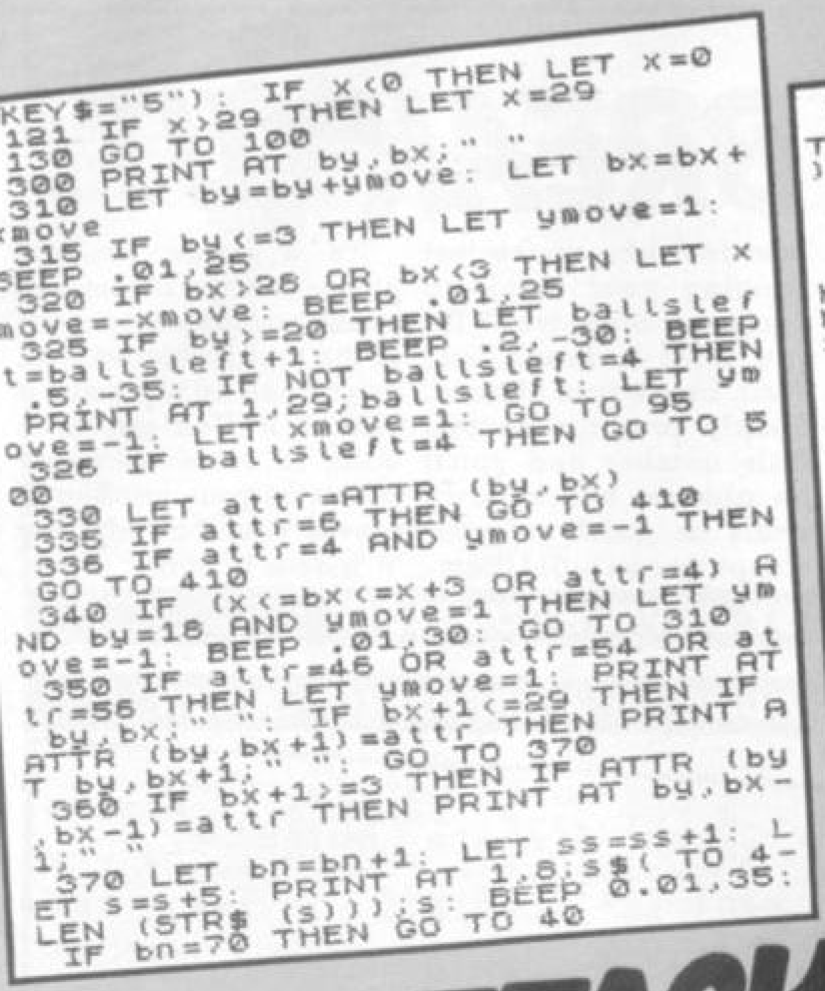
It's a game for one player and the object is to knock as many bricks out of the multicoloured wall as you can by bouncing a ball at it. You get three balls to score as many points as you can. Key '5' moves your bat left, key '8' moves it right.

BY DAVID HOUNSLOW

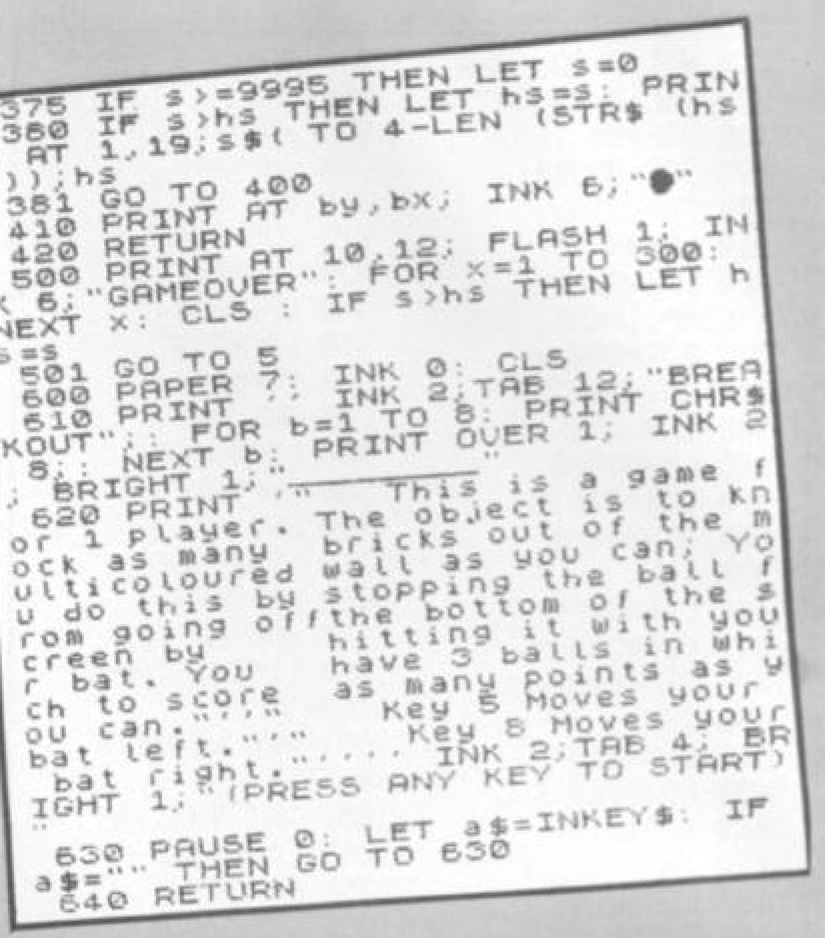
RUNS ON A SPECTRUM IN 16K

```
   1 LET hs=0: LET s$="0000"
   5 LET ss=0: PAPER 0: BORDER 0
: INK 7: FLASH 0: BRIGHT 0: CLS
: PRINT AT 10,2; FLASH 1;"Do you
 want instructions ?"
   6 LET a$=INKEY$: IF a$="" THE
N GO TO 6
   8 IF a$="y" OR a$="Y" THEN GO
 SUB 600
  10 LET s=0: LET ballsleft=1: L
ET b=5: FOR x=0 TO 7: READ row:
POKE USR "p"+x,row: NEXT x
  15 LET b$=CHR$ 16+CHR$ 4+"▬▬▬▬"
  20 DATA BIN 00111100,BIN 01111
110,255,255,255,255,BIN 01111110
,BIN 00111100
  30 RESTORE
  40 PAPER 0: INK 6: LET xmove=1
: LET ymove=-1
  50 BORDER 3
  52 REM page 1

  54 IF ss>=280 THEN CLS : LET b
allsleft=ballsleft-1: LET ss=0:
PRINT AT 10,10; FLASH 1; INK 6;"
EXTRA BALL": BEEP .25,20: FOR p=
1 TO 100: NEXT p: IF ballsleft=0
 THEN LET ballsleft=1
  55 CLS
  56 LET bn=0: IF hs<s THEN LET
hs=s
  57 PRINT AT 2,0; PAPER 2;"
                              ": P
RINT AT 1,2; PAPER 0; INK 7;"SCO
RE: "; INK 7;s$( TO 4-LEN (STR$ (
s)));s; INK 7;AT 1,14;"HIGH: ";s$
( TO 4-LEN (STR$ (hs)));hs; INK
7;AT 1,31-7;"BALL: "; INK 6;balls
left
  60 PRINT AT 3,0;
  70 FOR y=4 TO 8: FOR x=2 TO 29
 STEP 2: PRINT AT y,x; PAPER b+(
y/2=INT (y/2));"  ": LET b=b+1:
 IF b=7 THEN LET b=5
  80 NEXT x: NEXT y
  88 FOR y=0 TO 21: PRINT AT y,0
; PAPER 2;"  ";AT y,30;"  ": NEX
T y: PRINT AT 21,0; PAPER 2;"
                              ";A
T 0,0;"
                                "
  89 PRINT AT 18,0;"  ";AT 18,30
;"  ";AT 17,0;"  ";AT 17,30;"  "
  90 LET x=15
  91 BEEP .5,10: FOR q=1 TO 2: B
EEP .125,11: BEEP .125,12: BEEP
.125,13: BEEP .5,10: NEXT q
  95 LET by=20: LET bx=INT (RND*
20)+5: IF bx/2=INT (bx/2) THEN G
O TO 95
 100 PRINT AT 18,x;b$
 110 GO SUB 300
 115 IF INKEY$="" THEN GO TO 100
 117 PRINT AT 18,x;"     "
 120 LET x=x+2*(INKEY$="8")-2*(I
```



```
NKEY$="5"):  IF X<0 THEN LET x=0
 121 IF x>29 THEN LET X=29
 130 GO TO 100
 300 PRINT AT by,bx;" "
 310 LET by=by+ymove: LET bx=bx+
xmove
 315 IF by<=3 THEN LET ymove=1:
BEEP .01,25
 320 IF bx>26 OR bx<3 THEN LET x
move=-xmove: BEEP .01,25
 325 IF by>=20 THEN LET ballslef
t=ballsleft+1: BEEP .2,-30: BEEP
 .5,-35: IF NOT ballsleft=4 THEN
 PRINT AT 1,29;ballsleft: LET ym
ove=-1: LET xmove=1: GO TO 95
 326 IF ballsleft=4 THEN GO TO 5
00
 330 LET attr=ATTR (by,bx)
 335 IF attr=6 THEN GO TO 410
 336 IF attr=4 AND ymove=-1 THEN
 GO TO 410
 340 IF (x<=bx<=x+3 OR attr=4) A
ND by=18 AND ymove=1 THEN LET ym
ove=-1: BEEP .01,30: GO TO 310
 350 IF attr=46 OR attr=54 OR at
tr=56 THEN LET ymove=1: PRINT AT
 by,bx;" ": IF bx+1<=29 THEN IF
ATTR (by,bx+1)=attr THEN PRINT A
T by,bx+1;" ": GO TO 370
 360 IF bx+1>=3 THEN IF ATTR (by
,bx-1)=attr THEN PRINT AT by,bx-
1;" "
 370 LET bn=bn+1: LET ss=ss+1: L
ET s=s+5: PRINT AT 1,8;s$( TO 4-
LEN (STR$ (s)));s: BEEP 0.01,35:
 IF bn=70 THEN GO TO 40
```



```
 375 IF s>=9995 THEN LET s=0
 380 IF s>hs THEN LET hs=s: PRIN
T AT 1,19;s$( TO 4-LEN (STR$ (hs
)));hs
 381 GO TO 400
 410 PRINT AT by,bx; INK 6;"●"
 420 RETURN
 500 PRINT AT 10,12; FLASH 1; IN
K 6;"GAMEOVER": FOR x=1 TO 300:
NEXT x: CLS : IF s>hs THEN LET h
s=s
 501 GO TO 5
 600 PAPER 7: INK 0: CLS
 610 PRINT INK 2;TAB 12;"BREA
KOUT";: FOR b=1 TO 8: PRINT CHR$
 8;: NEXT b: PRINT OVER 1; INK 2
; BRIGHT 1;"________"
 620 PRINT ,"     This is a game f
or 1 player. The object is to kn
ock as many  bricks out of the m
ulticoloured wall as you can; Yo
u do this by stopping the ball f
rom going off the bottom of the s
creen by     hitting it with you
r bat. You   have 3 balls in whi
ch to score  as many points as y
ou can.",,"      Key 5 Moves your
bat left.",,,"     Key 8 Moves your
 bat right.",,,,: INK 2;TAB 4; BR
IGHT 1;"(PRESS ANY KEY TO START)
"
 630 PAUSE 0: LET a$=INKEY$: IF
a$="" THEN GO TO 630
 640 RETURN
```

AIR ATTACK

BY IAN STRINGER

You are in command of a giant battleship armed with all the latest weapons. And you are under attack.

Jet fighters, helicopters and armoured balloons are out to do your ship damage.

Your task is to use your supply of missiles — 20 in all — to the best advantage. Shoot down as many of the enemy as possible with the limited supply of weaponry. When your armament is used up the computer shows the high score.

RUNS ON AN ATARI 400 IN 16K

```
1 REM .    ***  AIR ATTACK  ***
2 REM .      By Ian Stringer
3 REM .           1982
4 REM
5 DIM Y(4):Y(0)=91:Y(1)=20:Y(2)=30:Y(3)=
40:Y(4)=88:REM Controls vertical positio
n of 4 players
6 X1=100:X2=150:X3=55:X0=100:Q1=-3:Q2=4:
Q3=-2:Q0=2:REM X controls horz. position
 of players. Q controls speed
7 B=75:B1=B:XA=60
10 PMBASE=54279:RAMTOP=106:SDMCTL=559:GR
ACTL=53277:HPOSP0=53248:HPOSP1=53249:HPO
SP2=53250:HPOSP3=53251
20 PCOLR0=704:PCOLR1=705:PCOLR2=706:PCOL
R3=707
30 SIZEP0=53256:SIZEP2=53258:REM Used to
 alter width of players 0 & 2
50 P1PF=53253:P2PF=53254:P3PF=53255:REM
Used to detect collisions between playfi
eld(missile) & players
90 POKE SIZEP0,1:POKE SIZEP2,1:REM Playe
rs 0 & 2 set to double width
99 REM
100 GRAPHICS 7
110 A=PEEK(RAMTOP)-24:POKE PMBASE,A:MYPM
BASE=256*A:POKE SDMCTL,46:POKE GRACTL,3
120 POKE HPOSP0,X0:POKE HPOSP1,X1:POKE H
POSP2,X2:POKE HPOSP3,X3
125 REM
130 FOR I=MYPMBASE+384 TO MYPMBASE+1024:
POKE I,0:NEXT I:REM Clears P-M RAM
140 FOR I=MYPMBASE+512+Y(0) TO MYPMBASE+
516+Y(0):READ A:POKE I,A:NEXT I
150 FOR I=MYPMBASE+640+Y(1) TO MYPMBASE+
644+Y(1):READ A:POKE I,A:NEXT I
160 FOR I=MYPMBASE+768+Y(2) TO MYPMBASE+
773+Y(2):READ A:POKE I,A:NEXT I
170 FOR I=MYPMBASE+896+Y(3) TO MYPMBASE+
905+Y(3):READ A:POKE I,A:NEXT I
180 REM Lines 140-170 read player data i
nto P-M RAM
190 POKE PCOLR0,88:POKE PCOLR1,26:POKE P
COLR2,138:POKE PCOLR3,186
191 POKE 752,1:SH=20:REM 752,1 removes c
ursor
192 GOSUB 1600
196 GOSUB 1500
199 REM
200 GOSUB 1000:REM MOVE TARGET
210 IF STRIG(0)=0 THEN ST=1
220 IF ST=1 THEN GOSUB 1200:REM BULLET
230 GOSUB 1100:REM MOVE SHIP
240 GOSUB 1300:REM CHECK HITS
250 IF SH=0 THEN GOSUB 1410
300 GOTO 200
1000 X1=X1+Q1:POKE HPOSP1,X1:IF X1<35 TH
EN X1=220
1010 X2=X2+Q2:POKE HPOSP2,X2:IF X2>220 T
HEN X2=35
1020 X3=X3+Q3:POKE HPOSP3,X3:IF X3>215 O
R X3<35 THEN Q3=-Q3
1090 RETURN
1100 F=230:IF STICK(0)=11 THEN X0=X0-Q0:
```

```
F=170
1110 IF STICK(0)=7 THEN X0=X0+Q0:F=180
1115 IF X0>199 THEN X0=199
1116 IF X0<40 THEN X0=40
1120 POKE HPOSP0,X0:SOUND 3,F,6,10
1130 RETURN
1200 COLOR 0:PLOT XA,B
1210 B=B-2:COLOR 1:PLOT X0-40,B:XA=X0-40
1220 SOUND 0,B,10,14
1250 IF B<2 THEN COLOR 0:PLOT XA,B:B=75:
ST=0:SH=SH-1
1290 RETURN
1300 IF PEEK(P1PF)<>0 THEN HIT=1:GOTO 13
40
1310 IF PEEK(P2PF)<>0 THEN HIT=2:GOTO 13
40
1320 IF PEEK(P3PF)<>0 THEN HIT=3:GOTO 13
40
1340 IF HIT=0 THEN 1390
1345 FOR S=20 TO -20 STEP -1:SOUND 0,ABS
(S),8,12:NEXT S
1350 IF HIT=1 THEN SC=SC+30:X1=30
1355 IF HIT=2 THEN SC=SC+15:X2=225
1360 IF HIT=3 THEN SC=SC+5:X3=43:Q=1
1385 COLOR 0:PLOT XA,B
1389 SOUND 0,0,0,0:ST=0:B=75:HIT=0:POKE
53278,1:SH=SH-1
1390 POKE 656,1:POKE 657,9:? SC
1395 POKE 656,1:POKE 657,30:? SH;" "
1400 RETURN
1410 OPEN #1,4,0,"K:":SOUND 3,0,0,0
1415 ? "}"
1420 POKE 656,1:POKE 657,2:? "  YOU SCOR
ED ";SC;" IN 20 SHOTS.             PL
AY AGAIN (Y/N)";:GET #1,K
1425 IF K=255 THEN 1420
1430 IF K<>89 THEN END
1435 IF SC>HSC THEN HSC=SC
1440 SC=0:SH=20
1480 ? "}"
1486 GOSUB 1500
1488 POKE 656,2:POKE 657,14:? HSC
1489 CLOSE #1
1490 RETURN
1500 POKE 656,1:POKE 657,3:? "SCORE"
1510 POKE 656,1:POKE 657,24:? "SHOTS"
1520 POKE 656,2:POKE 657,3:? "HIGH SCORE
"
1550 RETURN
1600 XX=0:POKE 656,0:POKE 657,10:? "***
AIR ATTACK ***":SOUND 0,255,10,8:SOUND 1
,254,10,8
1619 XX=XX+1:IF XX>10 THEN 1630
1620 POKE 656,2:POKE 657,13:? "Press STA
RT"
1630 IF PEEK(53279)=6 THEN 1690
1640 GOSUB 1000
1649 IF XX<10 THEN 1680
1650 POKE 656,2:POKE 657,19:? "        "
1651 IF XX>20 THEN XX=0
1680 GOTO 1619
1690 SOUND 0,0,0,0:SOUND 1,0,0,0:? "}":R
ETURN
2999 REM
3000 DATA 8,8,30,63,255,253,51,94,120,12
0,128,192,254,255,12,56,60,126,255,255,2
55,189,66,36,60,60
```

WORLD CUP

BY G. R. JOHNSON

RUNS ON A BBC MODEL B IN 32K

Remember the World Cup? Those heady summer days when England still had it all to play for and everyone was saying that this time the lads could pull it off . . .

Well they didn't quite make it did they? And now there's another four years to wait until the next one. Still, you can fill in the time by programming in our version of the World Cup conflict.

By special request we're reprinting one of *C&VG's* most popular program listings — first published in June last year. But this time we've adapted it so all you BBC owners out there can become soccer supremos.

World Cup Manager sets out to give you all the frustrations of sitting on the bench when the national side you manage go a goal down 20 minutes from time in a crucial match.

Hopefully, with some careful attention to tactics and good substitutions in critical games, it should give you all the elation of guiding your country's team through to the championships of the World Cup Finals.

It will let you manage any of the 24 countries involved in the 1982 World Cup but expect to have a more difficult time if you pick El Salvador than if you choose Brazil.

It invites you to enter your team and then publishes the draw for the competition with initially six groups of four. Set out the countries you think will be stumbling blocks to your continuation in the competition and send off your scouts to watch them.

Remember you can get through by finishing second in your group so it may not be necessary to watch all three teams in your group. The first game comes up and a dossier on the opposition is printed out. Pay careful attention because you will have to find good tactical answers to the opposition's ploys.

There are other considerations too, choose your formation carefully and if you need to boost your goal difference to quality, try to manufacture an open game.

Then it's out of your hands and the two teams are up against one another with a running commentary of events. Keep a close check on which of your players seem to lose possession and play badly, these are the one's you will want to substitute.

Also watch for which team is gaining the most possession in midfield — you may need to change tactics.

Check on how the goals are scored — it could be important to tighten up your defence to certain situations or to find out which of your own attacking ploys is paying dividends.

Half-time comes around and this is your chance to change your tactics if you have noticed things going wrong.

At the end of the day, win, lose or draw, you will have to sit back and watch the other results of the day being typed out and see if your predictions are coming true.

```
   .0  *TV 255,1
   20  MODE 7
   30  DIM K$(12)
   40  J$=STRING$(150,"?"):J$=""
   50  E1=0:E2=0:X3=0:X5=0
   60  DIM Q(4),W(4),D9(4),F9(4),A9(4),H%(4,3),D8(4),T9(4),P9(4),R%(24),S8(4),N1
(2),G%(24),O%(6,4),A%(3,3),B%(3,3),C%(3,3),D%(3,3),T4$(20),A$(24),F%(24),I%(3,3)
,J%(3,3),M%(24,21),N%(24),T%(24),U%(24),V%(24),W%(24),X%(24),Y%(24)
   70  DIM Z%(24),Z9$(12),A1$(9),A2$(9),E%(11):V=0:B4=0
   80  DEF FNA(X)=INT(RND(1)*X)+1
   90  DATA BRAZIL,ARGENTINA,W.GERMANY,YUGOSLAVIA,HUNGARY,BELGIUM,ITALY,POLAND,F
RANCE,CZECHOSLOVAKIA,SPAIN,ENGLAND,SCOTLAND,N.IRELAND,PERU,AUSTRIA,CHILE,EL SALV
ADOR,HONDURAS,ALGERIA,N.ZEALAND,CAMEROON,KUWAIT,RUSSIA
  100  DATA 1,1,0,1,2,1,1,0,0,0,0,1,1,2,1,0,2,2
  110  DATA " HITS THE BALL TOO FAR AHEAD OF ","'S PASS IS MISCONTROLLED BY ","
LOSES THE BALL IN A MISUNDERSTANDING WITH "," HITS A LONG BALL TO "," PASSES WID
E TO "," CROSSES TO "," PLAYS A HIGH BALL TO "," COLLECTS A PASS FROM "
  120  DATA " PLAYS A ONE-TWO WITH "," IS SENT AWAY BY "," WINS A FREE KICK FROM
 "," MOVES INSIDE "," SWERVES PAST "," DUMMIES "," RUNS ROUND "," RACES PAST ","
 SHRUGS OFF A CHALLENGE FROM "," IS TACKLED BY ","'S PASS IS CUT OUT BY "
  130  DATA "'S CROSS IS HEADED AWAY BY ",5,15,30,30,5,15,15,30,5,5,30,15,15,5,3
0,30,15,5,5,30,15,15,5,30,30,15,5,"'S CHIP FOR GOAL IS HEADED AWAY BY"," LOSES T
HE BALL TO"," IS TACKLED BY","'S VOLLEY IS PUNCHED CLEAR BY"
  140  DATA "'S FIERCE DRIVE IS WELL SAVED BY"," BLASTS THE BALL WIDE "," ROUNDS
 THE KEEPER AND MISKICKS "," BEATS TWO DEFENDERS AND SHOOTS WIDE "," STUMBLES AN
D LOSES THE BALL ","'S CHIP FOR GOAL FINDS THE BACK OF THE NET"
  150  DATA " BLASTS THE BALL HOME"," VOLLEYS INTO THE ROOF OF THE NET"," TAPS T
HE BALL IN FROM 5 YARDS"," HITS A LOW SHOT INTO THE NET","'S SHOT BOUNCES UNDER
THE KEEPER","'S SOFT SHOT IS DROPPED BY THE KEEPER"," LETS FLY WITH A LONG SHOT"
  160  DATA " STEPS INSIDE THE FULLBACK,ROUNDS THE KEEPER AND SLOTS HOME"
  170  PROCSORT:CLS:PRINT"CHOOSE YOUR TEAM-ENTER A NO. FROM LIST"
  180  X=1:PROCCHOOSE:PROCTEAM
  190  CLS:PRINT"NOW KEY IN THE NAMES OF YOUR PLAYERS":PRINT CHR$(136);"--MAXIMU
M OF 15 LETTERS--"
```

```
200  FOR I=1TO12
210  IF I=1 THEN PRINT"GOALKEEPER "
220  IF I>1ANDI<6 THEN PRINT"DEFENDER "+STR$(I-1)
230  IF I>5ANDI<9 THEN PRINT"MIDFIELD "+STR$(I-5)
240  IF I>8ANDI<12 THEN PRINT"STRIKER "+STR$(I-8)
250  IF I=12 THEN PRINT"SUBSTITUTE "
260  INPUT K$(I)
270  IF LEN(K$(I))>15 THEN PRINT"NAME IS TOO LONG.RE-ENTER.":GOTO 260
280  NEXT I
290  CLS:PRINT "YOU ARE MANAGER OF ";CHR$(136);A$(T)
300  PRINT "YOUR AIM IS TO WIN THE 1982 WORLD CUP"
310  PROCWAIT
320  FOR I=1TO6
330  S=0
340  Y=FNA(24)
350  IF G%(Y)<>0THEN GOTO 340
360  S=S+1
370  G%(Y)=I:O%(I,S)=Y
380  IF S=4 THEN GOTO 400
390  GOTO 340
400  NEXT I
410  CLS:PRINT"THE DRAW IS:-"
420  FOR I=1TO3
430  PRINT:PRINT "GP. "STR$(I);TAB(20);"GP. ";STR$(I+3):PRINT
440  FOR J=1TO4
450  PRINTA$(O%(I,J));TAB(20);A$(O%(I+3,J))
460  NEXT J:NEXT I
470  PRINT
```

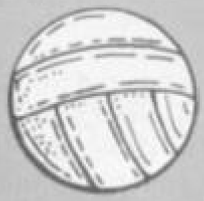
```
  480  PROCCONTINUE:PROCSCOUT:PROCFIXTURE:PROCSECSTAGE:PROCCONTINUE:PROCSECFIXT:
PROCSEMI:PROCSEMIPLAY:PROCFINAL
  490  PROCCONTINUE
  500  IF E2>E1 THEN B2=X2:B3=X1
  510  IF E1>E2 THEN B2=X1:B3=X2
  520  CLS:PRINTTAB(0,6)"CONGRATULATIONS TO:-":PRINTTAB(10,10);CHR$(136);A$(B2)
```

```
530  PRINTTAB(0,15);"1982 WORLD CUP WINNERS"
540  PRINTTAB(0,21)"DO YOU WISH TO PLAY AGAIN?"
550  INPUT "TYPE 'Y' OR 'N' " S$
560  IF ASC(S$)=89 THEN CLS:RUN
570  IF ASC(S$)=78 THEN CLS
580  IF ASC(S$)()89 AND ASC(S$)()78 THEN GOTO 550
```

```
590  END
600  DEFPROCSORT
610  FOR I=1TO24
620  F%(I)=INT(RND(1)*3)+1
630  READ A$(I)
640  X%(I)=FNA(3)
650  Y%(I)=FNA(3)
660  Z%(I)=FNA(3)
670  T%(I)=FNA(3)
680  U%(I)=FNA(3)
690  V%(I)=FNA(3)
700  W%(I)=FNA(3)
710  NEXT I
720  FOR I=1TO3
730  FOR J=1TO3
740  D%(I,J)=10
750  READ I%(I,J):READ J%(I,J)
760  NEXT J:NEXT I
770  FOR I=1TO20
780  READ T4$(I)
790  NEXT I
800  FOR I=1TO3
810  FOR J=1TO3
820  READ A%(I,J)
830  READ B%(I,J)
840  READ C%(I,J)
850  NEXT J:NEXT I
860  FOR I=1TO3
870  R%(I)=INT(RND(1)*10)+21
880  NEXT I
890  FOR I=4TO11
900  R%(I)=INT(RND(1)*10)+16
910  NEXT I
920  FOR I=12TO14
```

```
 930  R%(I)=20
 940  NEXT I
 950  FOR I=15TO17
 960  R%(I)=INT(RND(1)*5)+16
 970  NEXT I
 980  FOR I=18TO23
 990  R%(I)=INT(RND(1)*5)+11
1000  NEXT I
1010  R%(24)=INT(RND(1)*22)+11
1020  D%(1,1)=5
1030  D%(3,3)=15
1040  FOR I=1TO12
1050  Z9$(I)=" NO. "+STR$(I)
1060  NEXT I
1070  Z9$(1)="THEIR GOALKEEPER "
1080  FOR I=1TO9
1090  READ A1$(I)
1100  NEXT I
1110  FOR I=1TO9
1120  READ A2$(I)
1130  NEXT I
1140  ENDPROC
1150  DEF PROCCHOOSE
1160  FOR I=1TO12
1170  IF X=1 THEN GOTO 1240
1180  IF (T-I)*(T-12-I)()0 THEN GOTO 1240
1190  IF T=I+12 THEN GOTO 1220
1200  PRINTTAB(20);STR$(I+12);". ";A$(I+12)
1210  GOTO 1250
1220  PRINTSTR$(I);". ";A$(I)
1230  GOTO 1250
1240  PRINT STR$(I);". ";A$(I);TAB(20);STR$
```

```
(I+12);". ";A$(I+12)
1250  NEXT I
1260  PRINT:PRINT
1270  ENDPROC
1280  DEF PROCTEAM
1290  INPUT"WHICH TEAM?"T$
1300  T=VAL(T$)
1310  IF T(1 THEN GOTO 1340
1320  IF T)24 THEN GOTO 1340
1330  GOTO 1360
1340  PRINT"ENTER A NO. BETWEEN 1 & 24"
1350  GOTO 1290
1360  ENDPROC
1370  DEF PROCWAIT
1380  TIME=0:REPEAT:UNTIL TIME=400
1390  ENDPROC
1400  DEF PROCCONTINUE
1410  PRINT"PRESS ANY KEY TO CONTINUE"
1420  Z$=GET$
1430  IF Z$="" THEN 1420
1440  ENDPROC
1450  DEF PROCSCOUT
1460  CLS
1470  PRINT"SCOUTS CAN COMPILE DOSSIERS ON 4 TEAMS"
1480  PRINT"ENTER 4 NOS. FROM THE FOLLOWING:"
1490  PRINT"SEPARATED BY COMMAS":PRINT"========= == ======":PRINT
1500  X=2
1510  PROCCHOOSE
1520  INPUT S1,S2,S3,S4
1530  IF(S1-T)*(S2-T)*(S3-T)*(S4-T)=0 THEN GOTO 1570
1540  IF(S1-S2)*(S1-S3)*(S1-S4)*(S2-S3)*(S2-S4)*(S3-S4)=0 THEN 1570
1550  IF S1(1 OR S1)24 OR S2(1 OR S2)24 OR S3(1 OR S3)24 OR S4(1 OR S4)24 THEN
```



```
GOTO 1570
1560  ENDPROC
1570  PRINT"RE-ENTER 4 NOS.
FROM ABOVE LIST"
1580  GOTO1520
1590  ENDPROC
1600  DEF PROCFIXTURE
1610  W6=6
1620  D1=12
1630  H2=1:A2=2:PROCRESULT
1640  H2=3:A2=4:PROCRESULT
1650  H2=1:A2=3:PROCRESULT
1660  H2=2:A2=4:PROCRESULT
1670  H2=1:A2=4:PROCRESULT
1680  H2=2:A2=3:PROCRESULT
1690  ENDPROC
1700  DEF PROCRESULT
1710  D1=D1+1
1720  PROCPLAYCHECK
1730  CLS
1740  PRINT"RESULTS FOR ";D1;" JUNE '82"
1750  PRINT
1760  FOR I=1TO6
1770  H=O%(I,H2):A=O%(I,A2)
1780  IF H=T THEN B=P2:C=P3:GOTO 1810
1790  IF T=A THEN B=P3:C=P2:GOTO 1810
1800  GOSUB 2820
1810  PRINT"GP. ";I;" ";A$(H);" ";B;
" ";A$(A);" ";C
1820  NEXT I
1830  IF D1=18 THEN PROCCONTINUE:PROCTABLE
1840  PRINT
1850  IF D1=18 THEN ENDPROC
1860  PRINT"PRESS 'L' FOR LEAGUE TABLES"
1870  PRINT"      ANY OTHER KEY TO CONTINUE"
1880  Z$=GET$
1890  IFZ$="" THEN GOTO 1880
1900  IF Z$="L" THEN PROCTABLE
1910  ENDPROC
1920  DEF PROCTABLE
1930  IF W6=4 THEN PROCX
1940  IF W6=4 THEN GOTO 1960
1950  K1=1:K2=3:J1=4
1960  FOR I=1TOW6
1970  PROCPOS
1980  PROCPOSPRINT
1990  NEXT I
2000  ENDPROC
2010  DEF PROCPOS
2020  FOR J=1TOJ1
2030  Q(J)=0:F9(J)=0:A9(J)=0:P9(J)=0:W(J)=0:D8
(J)=0:D9(J)=0
2040  NEXT J
2050  FOR J=1TOJ1
2060  T9(J)=O%(I,J)
2070  FOR K = K1 TO K2
2080  IF M%(T9(J),K)=0 THEN GOTO 2190
2090  F9(J)=M%(T9(J),K+7)+F9(J)
2100  A9(J)=M%(T9(J),K+14)+A9(J)
2110  Z7=M%(T9(J),K+7)
2120  Z6=M%(T9(J),K+14)
2130  D8(J)=Z7-Z6+D8(J)
2140  Q(J)=Q(J)+1
2150  IF Z7=Z6 THEN D9(J)=D9(J)+1
2160  IF Z6<Z7 THEN W(J)=W(J)+1
2170  IF Z6<Z7 THEN P9(J)=P9(J)+2
2180  IF Z6=Z7 THEN P9(J)=P9(J)+1
2190  NEXT K
2200  NEXT J
2210  F2=0
2220  FOR J=1TOJ1-1
2230  IFP9(J)<P9(J+1) THEN PROCSWAP
2240  IFP9(J)=P9(J+1)THEN PROCGOALDIFF
2250  NEXT J
2260  IF F2=1 THEN GOTO 2210
2270  ENDPROC
2280  DEF PROCGOALDIFF
2290  IF D8(J)<D8(J+1)THEN PROCSWAP
2300  IF D8(J)<>D8(J+1) THEN ENDPROC
2310  IF F9(J)<F9(J+1) THEN PROCSWAP
2320  IF F9(J)<>F9(J+1)THEN ENDPROC
2330  IF FNA(2)=1 THEN PROCSWAP
2340  ENDPROC
2350  DEF PROCSWAP
2360  F3=T9(J):T9(J)=T9(J+1):T9(J+1)=F3
2370  F3=F9(J):F9(J)=F9(J+1):F9(J+1)=F3
2380  F3=A9(J):A9(J)=A9(J+1):A9(J+1)=F3
2390  F3=D8(J):D8(J)=D8(J+1):D8(J+1)=F3
2400  F3=D9(J):D9(J)=D9(J+1):D9(J+1)=F3
2410  F3=P9(J):P9(J)=P9(J+1):P9(J+1)=F3
2420  F3=W(J):W(J)=W(J+1):W(J+1)=F3
2430  F3=Q(J):Q(J)=Q(J+1):Q(J+1)=F3
2440  F2=1
2450  ENDPROC
2460  DEF PROCPOSPRINT
2470  PRINT
2480  F$="F ":A4$="A "
2490  IF W6=6 THEN B$=CHR$(I+48)
2500  IF W6=4 THEN B$=CHR$(I+64)
2510  PRINT"GP. ";B$;" LEAGUE TABLE"
2520  FOR J=1TOJ1
2530  IF F9(J)>9 THEN F$=" F "
2540  IF A9(J)>9 THEN A4$=" A "
2550  NEXT J
2560  PRINTTAB(20);" P W D L ";F$;A4$;"Pts."
2570  FOR J=1TOJ1
2580  P4$=" ":P5$=" "
2590  L9=Q(J)-W(J)-D9(J)
2600  IF F$=" F " THEN GOTO 2770
2610  IF A4$=" A " THEN GOTO 2790
2620  Y1$=STR$(J)+". "+A$(T9(J))
2630   PRINTY1$;TAB(21);Q(J);" ";W(J);" ";D9(J);" "
;L9;P4$;F9(J);P5$;A9(J);" ";
2640  IF W6+J-5=0 THEN PROCSEMITEAM
2650  IF W6=4 THEN 2670
2660  IF J<3 THEN PROCY
2670  NEXT J
2680  IF W6=6 THEN 2710
2690  IFI<4 THEN 2760
2700  GOTO 2730
```

```
3320  IF J=2 THEN H%(3,2)=T9(J)
3330  GOTO 3240
3340  IF J=1 THEN H%(3,3)=T9(J)
3350  IF J=2 THEN H%(1,3)=T9(J)
3360  GOTO 3240
3370  IF J=1 THEN H%(4,2)=T9(J)
3380  IF J=2 THEN H%(2,2)=T9(J)
3390  GOTO 3240
3400  IF J=1 THEN H%(2,3)=T9(J)
3410  IF J=2 THEN H%(4,3)=T9(J)
3420  GOTO 3240
3430  DEF PROCOPPVAL
3440  IF O%(I,H2)<>T THEN Z=O%(I,H2)
3450  IF O%(I,H2)=T THEN Z=O%(I,A2)
3460  PROCGAMEPLAY
3470  ENDPROC
3480  DEF PROCGAMEPLAY
3490  CLS:PRINTA$(T);" V. ";A$(Z):PRINT
3500  B=0:C=0:B4=0:B5=0:B6=0
3510  PROCSCOUTREP:PROCTACTSEL:
PROCOPPTEAM
3520  Z3=0:Z4=0:W1=0
3530  K4=D%(Z%(T),Z%(Z))+30:
W3=R%(T):W4=R%(Z)
3540  W3=W3+2*I%(F%(T),
F%(Z)):W4=W4+2*I%(F%(Z),F%(T))
3550  FOR I=1TO11:E%(I)=0:NEXT I
3560  U1=0
3570  CLS:PRINT"THE REF BLOWS HIS
WHISTLE TO START GAME"
3580  FOR I=1TOK4
3590  Z1=T
3600  IF FNA(W3+W4)>R%(T) THEN Z1=Z
3610  IF Z1=T THEN Z8=Z
3620  IF Z1=Z THEN Z8=T
3630  PROCDETPOSS
3640  Z8$=" HAVE "
3650  PROCPOSSREG
3660  PRINTA$(Z1);Z8$;"POSSESSION":PRINT
3670  IF Z1=T THEN PROCPLAYRAN
3680  IF Z1=Z THEN PROCRANPLAY
3690  J$=Z5$+T4$(G1)+Z6$:PROCMOVEPRI
3700  PRINT:PROCWAIT
3710  Z4=Z2:Z3=Z1
3720  IF Z2=1 THEN U1=U1+1:E%(A3)=E%(A3)+1
3730  IF Z2=2 THEN PROCSCORCHAN
3740  IF I=22 THEN PROCHALTIM
3750  NEXT I
3760  H=T:A=Z
3770  PRINT"NOTHING ELSE OF SIGNIFICANCE
HAPPENS    DURING THE GAME"
3780  PRINT:PRINT"FINAL SCORE"
3790  PRINTA$(T);" ";B;" ";A$(Z);" ";C
3800  P2=B:P3=C:PROCCONTINUE
3810  IF X3=0 THEN GOSUB 2990:ENDPROC
3820  IF B=C THEN 3850
3830  IF V=0 THEN ENDPROC
3840  GOSUB 2990:ENDPROC
3850  IF X5=1 THEN 3900
3860  Z3=0:Z4=0:K4=15
3870  X5=1
3880  CLS:PRINT"EXTRA TIME BEING PLAYED"
3890  GOTO 3580
3900  X5=0
3910  CLS:PRINT"PENALTIES WILL DECIDE THE RESULT"
3920  J$=" SHOOTS WIDE"
3930  IF RND(1)>.5 THEN B=B+1:J$=" SCORES FROM THE SPOT"
3940  J$=K$(1+FNA(10))+J$:PROCMOVEPRI
3950  J$=" SHOOTS WIDE"
3960  IF RND(1)>.5 THEN C=C+1:J$=" SCORES FROM THE SPOT"
3970  J$=Z9$(1+FNA(10))+J$:PROCMOVEPRI
3980  IF B=C THEN 3920
3990  PRINT"FINAL SCORE ":PRINTA$(T);" ";B;" ";A$(Z);" ";C
```

```
2710  IF I<3 THEN 2760
2720  IF (I-4)*(I-5)=0 THEN 2760
2730  PRINT"PRESS ANY KEY TO CONTINUE"
2740  Z$=GET$
2750  IF Z$="" THEN GOTO 2740
2760  ENDPROC
2770  IF F9(J)<10 THEN P4$="  "
2780  GOTO 2610
2790  IF A9(J)<10 THEN P5$="  "
2800  GOTO 2620
2810  ENDPROC
2820  B=0:C=0
2830  IF FNA(100)<60 THEN GOTO 2850
2840  B=I%(F%(H),F%(A)):C=J%(F%(H),F%(A)
2850  B1=FNA(8):C1=FNA(8)
2860  B1=B1+R%(H):C1=C1+R%(A)
2870  D=INT((ABS(B1-C1))/5)
2880  IF D<>0 THEN 2950
2890  B=B+FNA(2)-1
2900  C=C+FNA(2)-1
2910  IF FNA(2)=2 THEN GOTO 2990
2920  IF R%(H)>R%(A) THEN B=B+FNA(2)-1
2930  IF R%(A)>R%(H) THEN C=C+FNA(2)-1
2940  GOTO 2990
2950  IF B1>C1 THEN B=B+D
2960  IF C1>B1 THEN C=C+D
2970  IF FNA(500)>498 THEN B=B+FNA(3)
2980  IF FNA(500)>498 THEN C=C+FNA(3)
2990  N%(H)=N%(H)+1:N%(A)=N%(A)+1
3000  M%(H,N%(H))=A
3010  M%(A,N%(A))=H
3020  M%(H,N%(H)+7)=B
3030  M%(A,N%(A)+7)=C
3040  M%(H,N%(H)+14)=C
3050  M%(A,N%(A)+14)=B
3060  RETURN
3070  DEF PROCPLAYCHECK
3080  FOR I=1TOW6
3090  IF(O%(I,H2)-T)*(O%(I,A2)-T)=0
THEN PROCOPPVAL
3100  NEXT I
3110  ENDPROC
3120  DEF PROCX
3130  K1=4:K2=5:J1=3
3140  FOR I=1TO4
3150  FOR J=1TO3
3160  O%(I,J)=H%(I,J)
3170  NEXT J:NEXT I
3180  ENDPROC
3190  DEF PROCSEMITEAM
3200  S8(I)=T9(J)
3210  ENDPROC
3220  DEF PROCY
3230  ON I GOTO 3250,3280,3310,3340,
3370,3400
3240  ENDPROC
3250  IF J=1 THEN H%(1,1)=T9(J)
3260  IF J=2 THEN H%(3,1)=T9(J)
3270  GOTO 3240
3280  IF J=1 THEN H%(2,1)=T9(J)
3290  IF J=2 THEN H%(4,1)=T9(J)
3300  GOTO 3240
3310  IF J=1 THEN H%(1,2)=T9(J)
```

```
4000  P2=B:P3=C
4010  ENDPROC
4020  DEF PROCSCOUTREP
4030  D4=0
4040  IF (Z-S1)*(Z-S2)*
(Z-S3)*(Z-S4)=0 THEN D4=1
4050  IF D4=1
THEN J$="YOUR SCOUTS
REPORT ON "+A$(Z):PROCMOVEPRI
4060  E=Z
4070  IF D4=1 THEN PROCCONTINUE
4080  PROCREP:ENDPROC
4090  DEF PROCTACTSEL
4100  CLS:PRINT"WHAT FORMATION
SHALL WE PLAY BOSS?"
```

```
4110  FOR F1=1TO3
4120  PROCFORM
4130  PRINTF1;" ";C$
4140  NEXT F1
4150  PROCZ:F%(T)=E9:PRINT
4160  PRINT"WHAT ARE THE DEFENCE PLANS BOSS?"
4170  FOR F1=1TO3
4180  PROCDEFTACT
4190  PRINTF1;" ";C$
4200  NEXT F1
4210  PROCZ:X%(T)=E9:PRINT
4220  PRINT"WHAT ATTACK PLANS GUV?"
4230  FOR F1=1TO3
4240  PROCATTACT
4250  PRINTF1;" ";C$
4260  NEXT F1
4270  PROCZ:Y%(T)=E9:PRINT
4280  PRINT"WHAT ABOUT MIDFIELD BOSS?"
4290  FOR F1=1TO3
4300  PROCMIDTACT
4310  PRINTF1;" ";C$
4320  NEXT F1
4330  PROCZ:Z%(T)=E9:PRINT
4340  PRINT"WHAT IF WE GET A FREEKICK UPFIELD BOSS?"
4350  FOR F1=1TO3
4360  PROCFREETACT
4370  PRINTF1;" ";C$
4380  NEXT F1
4390  PROCZ:T%(T)=E9:PRINT
4400  PRINT"HOW DO WE DEFEND AGAINST A FREEKICK?"
4410  FOR F1=1TO3
```

```
4420  PROCFREEDEF
4430  PRINTF1;" ";C$
4440  NEXT F1
4450  PROCZ:U%(T)=E9:PRINT
4460  PRINT"WHAT SHALL WE DO WITH
OUR CORNERS?"
4470  FOR F1=1TO3
4480  PROCCORNTACT
4490  PRINTF1;" ";C$
4500  NEXT F1
4510  PROCZ:V%(T)=E9:PRINT
4520  PRINT"WHAT ABOUT THEIR CORNERS?"
4530  FOR F1=1TO3
4540  PROCCORNDEF
4550  PRINTF1;" ";C$
4560  NEXT F1
4570  PROCZ:W%(T)=E9
4580  ENDPROC
4590  DEF PROCOPPTEAM
4600  CLS:PRINT"DO YOU WISH TO TYPE
IN THE OPPOSITION  PLAYERS' NAMES?"
4610  INPUT"TYPE Y OR N "D3$
4620  IF ASC(LEFT$(D3$,1))=78 THEN
PROCOPPNAME:ENDPROC
4630  IF ASC(LEFT$(D3$,1))<>89 THEN 4610
4640  FOR I=1TO12
4650  PRINT"ENTER NAME OF PLAYER ";I:
IF I=1 THEN
PRINT CHR$(136);"--MAXIMUM OF 5 LETTERS-"
4660  INPUT Z9$(I)
4670  IF LEN(Z9$(I))>15 THEN PRINT"NAME
IS TOO LONG. RE-ENTER.":GOTO 4660
```

```
4680  NEXT I
4690  ENDPROC
4700  DEF PROCDETPOSS
4710  G1=FNA(20)
4720  IF G1<4 THEN Z2=1
4730  IF G1<4 THEN ENDPROC
4740  IF G1>17 THEN Z2=1
4750  IF G1>17 THEN ENDPROC
4760  Z2=2:ENDPROC
4770  DEF PROCPOSSREG
4780  IF Z4<>1 THEN ENDPROC
4790  IF Z3<>Z1 THEN ENDPROC
4800  Z8$=" REGAIN "
4810  ENDPROC
4820  DEF PROCPLAYRAN
4830  A3=FNA(10)+1:Z5$=K$(A3)
4840  IF G1>10 THEN Z6$=Z9$(FNA(10)+1)
4850  IF G1>10 THEN ENDPROC
4860  A4=FNA(10)+1
4870  IF A4=A3 THEN 4860
4880  Z6$=K$(A4)
4890  ENDPROC
4900  DEF PROCRANPLAY
4910  A3=FNA(10)+1:Z5$=Z9$(A3)
4920  IF G1>10 THEN Z6$=K$(FNA(10)+1)
4930  IF G1>10 THEN ENDPROC
4940  A4=FNA(10)+1
4950  IF A4=A3 THEN 4940
4960  Z6$=Z9$(A4):ENDPROC
4970  DEF PROCMOVEPRI
4980  IF LEN(J$)<=39 THEN PRINTJ$
4990  IF LEN(J$)<39 THEN PRINT
5000  IF LEN(J$)<=39 THEN ENDPROC
5010  FOR J=39TO1 STEP-1
5020  IF ASC(MID$(J$,J,1))=32 THEN PRINT
LEFT$(J$,J):J$=RIGHT$(J$,LEN(J$)-J):J=0
```

```
5030  NEXT J
5040  GOTO 4980
5050  ENDPROC
5060  DEF PROCSCORCHAN
5070  Z4=1:G3=FNA(7)
5080  IF G1<8 THEN Z1$=Z6$
5090  IF G1>7 THEN Z1$=Z5$
5100  ON G3 GOSUB 5120,5120,5120,5120,5160,5160,5250
5110  ENDPROC
5120  G3=FNA(100)
5130  IF C%(Y%(Z3),X%(Z8))>100-G3+B4 THEN PROCGOAL:RETURN
5140  PROCA
```

```
5150  RETURN
5160  PRINT:PRINTA$(Z1);" WIN A CORNER"
5170  IF Z1=T THEN Z1$=K$(5+FNA(6))
5180  IF Z1=Z THEN Z1$=Z9$(5+FNA(6))
5190  J$="FROM THE KICK THE BALL REACHES"+" "+Z1$
5200  PROCMOVEPRI
5210  G3=FNA(100)
5220  IF B%(Y%(Z3),X%(Z8)))100-G3+B6 THEN B6=B6+2:PROCGOAL:RETURN
5230  PROCA
5240  RETURN
5250  PRINT
5260  IF Z1=T THEN Z5$=Z9$(1+FNA(4))
5270  IF Z1=Z THEN Z5$=K$(1+FNA(4))
5280  J$=Z1$+" IS BROUGHT DOWN BY "+Z5$+".THE REF AWARDS "+A$(Z1)
5290  J$=J$+" A FREEKICK JUST OUTSIDE THE BOX":PROCMOVEPRI
5300  PRINT:PRINT"FROM THE FREEKICK "
5310  G3=FNA(100)
5320  IF C%(Y%(Z3),X%(Z8)))100-G3+B5 THEN B5=B5+2:PROCGOAL:RETURN
5330  PROCA
5340  RETURN
5350  DEF PROCHALTIM
5360  PRINT:PRINT"HALFTIME SCORE:"
5370  PRINTA$(T);" ";B;" ";A$(Z);" ";C
5380  PRINT"DO YOU WISH TO CHANGE TACTICS?"
5390  INPUT "TYPE 'Y' OR 'N' " Z$
5400  IF ASC(LEFT$(Z$,1))()78 AND ASC(LEFT$(Z$,1))()89 THEN 5390
5410  IF ASC(LEFT$(Z$,1))=89 THEN PROCTACTSEL
5420  PROCSUB:ENDPROC
5430  DEF PROCREP
5440  PRINT"PROFILE ON ";A$(E):PRINT
5450  PROCPASTRES
5460  PRINT:F1=X%(E)
5470  PROCDEFTACT
5480  PRINT
5490  PRINT"IN DEFENCE THEY";C$:PRINT
5500  F1=Y%(E):PROCATTACT
5510  PRINT"IN ATTACK THEY USE THE";C$:PRINT
5520  F1=Z%(E):PROCMIDTACT
5530  PRINT"IN MIDFIELD THEY";C$:PRINT
5540  IF D4=0 THEN PROCCONTINUE:ENDPROC
5550  F1=T%(E):PROCFREETACT
5560  PRINT"IN FREEKICKS AROUND THE BOX THEY USE A":PRINTC$
5570  F1=U%(E):PROCFREEDEF
5580  PRINT"AND DEFENDING AGAINST FREEKICKS THEY":PRINTC$:PRINT
5590  F1=V%(E):PROCCORNTACT
5600  PRINT"FROM A CORNER THEY";C$
5610  F1=W%(E):PROCCORNDEF
5620  PRINT"WHEN FACED WITH A CORNER THEY":PRINTC$:PRINT
5630  F1=F%(E):PROCFORM
5640  PRINT"THEY NORMALLY PLAY";C$;"FORMATION":PRINT
```

```
5650  PROCCONTINUE
5660  ENDPROC
5670  DEF PROCFORM
5680  IF F1=1 THEN C$=" A 4-3-3 "
5690  IF F1=2 THEN C$=" A 4-4-2 "
5700  IF F1=3 THEN C$=" A 4-2-4 "
5710  ENDPROC
5720  DEF PROCDEFTACT
5730  IF F1=1 THEN C$=" USE A SWEEPER "
5740  IF F1=2 THEN C$=" INTERCEPT PASSES "
5750  IF F1=3 THEN C$=" SHADOW ATTACKERS "
5760  ENDPROC
5770  DEF PROCATTACT
5780  IF F1=1 THEN C$=" FAST BREAK "
5790  IF F1=2 THEN C$=" EARLY CROSS "
5800  IF F1=3 THEN C$=" SLOW BUILD-UP "
5810  ENDPROC
5820  DEF PROCMIDTACT
5830  IF F1=1 THEN C$=" TACKLE HARD "
5840  IF F1=2 THEN C$=" MARK TIGHTLY "
5850  IF F1=3 THEN C$=" FIND SPACE "
5860  ENDPROC
5870  DEF PROCFREETACT
5880  IF F1=1 THEN C$=" DIRECT SHOT "
5890  IF F1=2 THEN C$=" CHIP TO THE FAR POST "
5900  IF F1=3 THEN C$=" TEE-UP FOR SHOT "
```

```
5910  ENDPROC
5920  DEF PROCFREEDEF
```

```
5930  IF F1=1 THEN C$=" MAKE A WALL "
5940  IF F1=2 THEN C$=" MARK MAN-TO-MAN "
5950  IF F1=3 THEN C$=" RUSH THE KICKER "
5960  ENDPROC
5970  DEF PROCCORNTACT
5980  IF F1=1 THEN C$=" PLAY IT SHORT "
5990  IF F1=2 THEN C$=" AIM FOR THE FAR POST "
6000  IF F1=3 THEN C$=" AIM FOR THE NEAR POST "
6010  ENDPROC
6020  DEF PROCCORNDEF
6030  IF F1=1 THEN C$=" MOVE OUT FAST "
6040  IF F1=2 THEN C$=" RELY ON THE GOALKEEPER "
6050  IF F1=3 THEN C$=" USE CLOSE MARKING "
6060  ENDPROC
6070  DEF PROCZ
6080  INPUT "ENTER A NO. BETWEEN 1 & 3:"E$
6090  IF LEN(E$)<>1 THEN 6140
6100  IF ASC(E$)<49 THEN 6140
6110  IF ASC(E$)>51 THEN 6140
6120  E9=VAL(E$)
6130  ENDPROC
6140  PRINT"PLEASE RE-ENTER"
6150  GOTO 6080
6160  ENDPROC
```

```
6170  DEF PROCOPPNAME
6180  FOR I=1TO12
6190  Z9$(I)="NO. "+STR$(I)
6200  NEXT I
6210  Z9$(1)="THEIR GOALKEEPER "
6220  ENDPROC
6230  DEF PROCGOAL
6240  PRINT
6250  B4=B4+2.5:J$=Z1$+A2$(FNA(9)):PROCMOVEPRI
6260  PROCSCORE:PROCSUB
6270  IF I=K4 THEN ENDPROC
6280  PRINT"FROM THE KICK-OFF"
6290  ENDPROC
6300  DEF PROCSCORE
6310  J$="IT'S A GOAL! "+A$(Z1)+" HAVE SCORED":PROCMOVEPRI
6320  IF Z1=T THEN B=B+1
6330  IF Z1=Z THEN C=C+1
6340  D2=I*2
6350  IF RND(1)>.5 THEN D2=D2-1
6360  PRINT
6370  Z$=" MINUTES"
6380  IF D2=1 THEN Z$=" MINUTE"
6390  PRINT"SCORE AFTER ";D2;Z$
6400  PRINT:PRINT A$(T);" ";B;" ";A$(Z);" ";C
6410  Z2=1:ENDPROC
6420  DEF PROCA
6430  G3=FNA(9):Z1$=Z1$+A1$(G3)
6440  IF Z8=T THEN H$=" "+K$(1+FNA(4))
6450  IF Z8=Z THEN H$=" "+Z9$(1+FNA(4))
6460  IF G3<4 THEN Z1$=Z1$+H$
6470  IF G3<4 THEN J$=Z1$:PROCMOVEPRI:Z2=1:ENDPROC
6480  IF Z8=T THEN H$=" "+K$(1)
6490  IF Z8=Z THEN H$=" "+Z9$(1)
6500  IF G3<6 THEN J$=Z1$+H$:PROCMOVEPRI:ENDPROC
6510  J$=Z1$:PROCMOVEPRI:ENDPROC
6520  DEF PROCSUB
6530  IF W1=1 THEN PROCCONTINUE:ENDPROC
6540  PRINT"PRESS 'S' TO BRING ON SUBSTITUTE":PRINT"       ANY OTHER KEY TO CONT
INUE"
6550  Z$=GET$
6560  IF Z$="" THEN 6550
6570  IF ASC(Z$)<>83 THEN ENDPROC
6580  CLS:W1=1
6590  W1=1
6600  FOR J=2TO11:PRINTJ;" ";K$(J):NEXT J
6610  PRINT"ENTER A NO. FROM 2 TO 11":PRINT"TO SHOW THE PLAYER TO BE SUBSTITUTE
D"
6620  INPUT K
6630  IF K>11 THEN 6620
6640  IF K<2 THEN 6620
6650  PRINT:J$=K$(K)+" TRUDGES OFF TO BE REPLACED BY "+K$(12):PROCMOVEPRI
6660  Z$=K$(K):K$(K)=K$(12):K$(12)=Z$
6670  W3=W3+(-(U1/10)+E%(K))*2
```

```
6680  ENDPROC
6690  DEF PROCPASTRES
6700  IF N%(E)=0 THEN ENDPROC
6710  PRINT:PRINT"RESULTS SO FAR":PRINT
6720  FOR I=1TON%(E)
6730  PRINTA$(E);" ";M%(E,I+7);" ";A$(M%(E,I));" ";M%(E,I+14)
6740  NEXT I
6750  PRINT:PROCCONTINUE
6760  ENDPROC
6770  DEF PROCSECSTAGE
6780  CLS:PRINT"GROUPS FOR THE 2ND. STAGE ARE :-":PRINT
6790  FOR I=1TO2
6800  PRINT"GP. ";CHR$(64+I);TAB(20);"GP. ";CHR$(66+I)
6810  PRINT
6820  FOR J=1TO3
6830  PRINTA$(H%(I,J));TAB(20);A$(H%(I+2,J))
6840  NEXT J
6850  PRINT
6860  NEXT I
6870  ENDPROC
6880  DEF PROCSECFIXT
6890  W6=4:D1=27
6900  H2=1:A2=2:PROCSECRES
6910  H2=3:A2=1:PROCSECRES
6920  H2=2:A2=3:PROCSECRES
6930  ENDPROC
6940  DEF PROCSECRES
6950  PROCJ:PROCPLAYCHECK
6960  CLS:PRINT"RESULTS FOR ";D1;" JUNE '82"
6970  PRINT
6980  FOR I=1TO4
6990  H=H%(I,H2):A=H%(I,A2)
7000  IF H=T THEN B=P2:C=P3:GOTO 7030
7010  IF T=A THEN B=P3:C=P2:GOTO 7030
7020  GOSUB 2820
7030  PRINT"GP. ";CHR$(I+64);" ";A$(H);" ";B;" ";A$(A);" ";C
7040  NEXT I
7050   IF D1=29 THEN PROCCONTINUE:PROCTABLE
7060  PRINT
7070  IF D1=29 THEN ENDPROC
7080  PRINT"PRESS 'L' TO SHOW LEAGUE TABLES":PRINT"       ANY OTHER KEY TO CONT
NUE"
7090  Z$=GET$
7100  IF Z$="" THEN GOTO 7090
7110  IF Z$="L" THEN PROCTABLE
7120  D1=D1+1:ENDPROC
7130  DEFPROCJ
7140  FOR I=1TO4
7150  FOR J=1TO3
7160  O%(I,J)=H%(I,J)
7170  NEXT J:NEXT I
7180  ENDPROC
7190  DEF PROCSEMI
7200  CLS:PRINT"SEMI-FINALS":PRINT"==== ======"
7210  FOR I=1TO4
7220  PRINT
7230  NEXT I
7240  PRINTA$(S8(1));TAB(16);"V.             ";A$(S8(3))
7250  FOR I=1TO4
7260  PRINT
7270  NEXT I
7280  PRINTA$(S8(2));TAB(16);"V.               ";A$(S8(4))
7290  FOR I=1TO6
7300  PRINT
7310  NEXT I
7320  PROCCONTINUE
7330  ENDPROC
7340  DEF PROCSEMIPLAY
7350  CLS:PRINT"BARCELONA 8th JULY 1982":PRINT
7360  PRINT"SEMI-FINAL":PRINT
7370  PRINTA$(S8(1));" V. ";A$(S8(3))
7380  X3=1
7390  PROCWAIT
7400  X1=S8(1):X2=S8(3)
```

```
7410  PROCR
7420  CLS:PRINT"SEVILLE 8th JULY 1982":PRINT
7430  PRINT"SEMI-FINAL":PRINT
7440  E2=0:E1=0
7450  PRINTA$(S8(2));" V. ";A$(S8(4))
7460  PROCWAIT
7470  X1=S8(2):X2=S8(4)
7480  PROCR
7490  ENDPROC
7500  DEF PROCB
7510  FOR I=1TO90
7520  IF RND(1)>86/90 THEN PROCD
7530  IF I=45 THEN PROCE
7540  IF I/10=INT(I/10) THEN PROCF
7550  NEXT I
7560  IF E1=E2 THEN PROCG
7570  PRINT"FINAL SCORE"
7580  PRINTA$(X1);" ";E1;" ";A$(X2);" ";E2
7590  ENDPROC
7600  DEF PROCC
7610  W5=W5+1
7620  IF V=1 THEN ENDPROC
7630  IF E1>E2 THEN N1(W5)=X1
7640  IF E2>E1 THEN N1(W5)=X2
7650  ENDPROC
7660  DEF PROCD
7670  R7=RND(1)
7680  CLS:R9=R%(X1)/(R%(X1)+R%(X2))
7690  IF R7=R9 THEN 7670
7700  IF R7<R9 THEN J$=A$(X1)+" HAVE SCORED AFTER "+STR$(I)+" MINUTES"
7710  IF I=1 THEN J$=LEFT$(J$,LEN(J$)-1)
7720  IF R7<R9 THEN PROCMOVEPRI
7730  IF R7<R9 THEN E1=E1+1
7740  IF R7>R9 THEN J$=A$(X2)+" HAVE SCORED AFTER "+STR$(I)+" MINUTES"
7750  IF R7>R9 THEN PROCMOVEPRI
7760  IF R7>R9 THEN E2=E2+1
7770  PROCWAIT:ENDPROC
7780  DEF PROCE
7790  PRINT:PRINT"HALF TIME SCORE:"
7800  PRINT:PRINTA$(X1);" ";E1;" ";A$(X2);" ";E2:PRINT
7810  PROCWAIT:ENDPROC
7820  DEF PROCF
7830  CLS:PRINT"SCORE AFTER ";I;" MINUTES ";":"
7840  PRINTA$(X1);" ";E1;" ";A$(X2);" ";E2
7850  PROCWAIT:ENDPROC
7860  DEF PROCG
7870  CLS:PRINT"AFTER EXTRA TIME"
7880  R4=FNA(2)
7890  IF R4=1 THEN E1=E1+FNA(3)
7900  IF R4=2 THEN E2=E2+FNA(3)
7910  PROCWAIT:ENDPROC
7920  DEF PROCFINAL
7930  V=1:CLS:PRINT"MADRID 11th JULY 1982"
7940  FOR I=1TO6
7950  PRINT
7960  NEXT I
7970  PRINT"CUP FINAL":PRINT"=== ====="
7980  PRINTA$(N1(1));"  V. ";A$(N1(2))
7990  PROCWAIT:PROCWAIT
8000  CLS:E1=0:E2=0:X1=N1(1):X2=N1(2)
8010  IF X1=T THEN Z=X2:PROCGAMEPLAY:E1=B:E2=C:GOTO 8040
8020  IF X2=T THEN Z=X1:PROCGAMEPLAY:E1=C:E2=B:GOTO 8040
8030  PROCB:PROCC:
8040  ENDPROC
8050  DEF PROCR
8060  IF X1=T THEN Z=X2:PROCGAMEPLAY:E1=B:E2=C:PROCC:GOTO 8090
8070   IF X2=T THEN Z=X1:PROCGAMEPLAY:E1=C:E2=B:PROCC:GOTO 8090
8080  PROCB:PROCC
8090  N%(X1)=N%(X1)+1
8100  M%(X1,6)=X2:M%(X1,13)=E1:M%(X1,20)=E2
8110  N%(X2)=N%(X2)+1
8120  M%(X2,6)=X1:M%(X2,13)=E2:M%(X2,20)=E1
8130  IF (X1-T)*(X2-T)<>0 THEN PROCCONTINUE
8140  ENDPROC
```

BOMBER

BY JANEK SIRRS

RUNS ON A BBC MODEL A IN 16K

Ace pilots only need apply for this little excusion into the wild blue yonder. Well, it's not really the flying you have to worry about. It's getting your undercarriage planted firmly back on the ground that's the problem.

You must try to land your ancient fighter plane in the middle of a city. To do this you must create a makeshift runway by bombing the skyscrapers. But you are running out of fuel – so your time is very limited.

```
  10 REM *** BOMBER  by J.Sirrs, 1982 ***
  20 HISCORE%=0
  30 MODE5:PROCinit:PROCtitle:MODE4:PROCinst:!&FE00=&10200A
  40 PROCscreen
  50 PX%=PX%+1:IF ?FNS(PX%+2,PY%,N%)=126THENPROCcrash:GOTO370
  60 IFPX%=40ANDPY%<>29THENPRINTTAB(PX%-1,PY%);"    ";:PX%=0:PY%=PY%+1
  70 IFPX%=37ANDPY%=29THENPROCland:GOTO40
  80 IFPX%=0GOTO90 ELSEPRINTTAB(PX%-1,PY%)" ";PLANE$;
  90 I%=INKEY(0):IFI%>0ANDBOMB%=0PROCcreatebomb
 100 IFBOMB%=1THENPROCmovebomb
 110 PRINTTAB(11,1);SCORE%:FORL%=1TO400:NEXTL%:GOTO50
 120 DEFPROCcreatebomb
 130 BOMB%=1:BX%=PX%:BY%=PY%
 140 ENDPROC
 150 DEFPROCmovebomb
 160 FORL%=1TO2:IFBY%=PY%ANDBX%=PX%GOTO170 ELSEPRINTTAB(BX%,BY%);" "
 170 BY%=BY%+1:IF ?FNS(BX%,BY%,N%)=126THENPROCexplosion:SCORE%=SCORE%+1:GOTO210

 180 IFBY%>29THENL%=3:BOMB%=0:GOTO210
 190 IFBOMB%=0THENL%=3:GOTO210
 200 PRINTTAB(BX%,BY%);CHR$(227):SOUND1,-15,BY%*2,1
 210 NEXTL%:ENDPROC
 220 DEFPROCexplosion
 230 FORE%=0TORND(4):SOUND0,-15,4,1:IFBY%+E%>29THENE%=5:NEXTE%:L%=3:BOMB%=0:END
PROC
 240 PRINTTAB(BX%,BY%+E%);" ";:NEXTE%
 250 BOMB%=0:L%=3:ENDPROC
 260 DEFPROCland
 270 FORL%=1TO50:SOUND1,-15,L%,.05:NEXTL%
 280 FORL%=1TO20:IFL%/2=INT(L%/2)THENCH%=228ELSECH%=229
 290 PRINTTAB(35,29);CHR$(CH%):FORD%=1TO750:NEXTD%:NEXTL%
 300 PRINTTAB(12,12);"100 BONUS POINTS":FORL%=1TO5000:NEXTL%:PRINTTAB(12,12)"
               ";SCORE%=SCORE%+100
 310 PRINTTAB(35,29);"      ";CHR$(30)
 320 PY%=29:FORPX%=8TO36:PRINTTAB(PX%-1,PY%);"    ":PY%=PY%-.2:PRINTTAB(PX%,PY%)
;PLANE$:FORD%=1TO500:NEXTD%:NEXTPX%
 330 SK%=SK%+1:PX%=1:PY%=3:ENDPROC
 340 DEFPROCcrash
 350 FORL%=1TO20:VDU19,0,RND(15),0,0,0,19,1,RND(15),0,0,0:SOUND0,-15,RND(3)+3,1
:NEXTL%
 360 VDU19,0,6,0,0,0,19,1,0,0,0,0:ENDPROC
 370 CLS:VDU19,0,0,0,0,0,19,1,4,0,0,0
 380 PRINT''''"Oh dear you appear to have crashed your"
 390 PRINT'"plane!!!!"
 400 PRINT''"Your final score was :- ";SCORE%;" points."
 410 IFSCORE%>HISCORE%THENHISCORE%=SCORE%:PRINT''"Wow! You've just got the best
 score yet."
 420 PRINT''"Today's high score is :- ";HISCORE%:SCORE%=0:PX%=1:PY%=3:BOMB%=0
 430 PRINT'''TAB(8)"ANOTHER GAME (Y/N) ?"
 440 A$=GET$:IFA$="Y"GOTO30ELSEGOTO450
 450 MODE7:END
 460 DEFPROCscreen
 470 CLS:VDU19,0,4,0,0,0,19,1,7,0,0,0
 480 PRINTTAB(5,1);"SCORE:";SCORE%;TAB(20,1);"HI-SCORE:";HISCORE%
 490 PRINTTAB(0,30);STRING$(40,CHR$(233));CHR$(30)
 500 FORL%=3TO36:BH%=RND(3*SK%):PRINTTAB(L%,29);:FORB%=1TOBH%:PRINTCHR$(231);CH
R$(11);CHR$(8);:SOUND1,-15,B%*3,1:NEXTB%:PRINTCHR$(230):NEXTL%
 510 PRINTTAB(PX%,PY%);PLANE$
 520 ENDPROC
 530 DEFPROCinit
```

```
  540 VDU23,224,24,28,31,0,0,0,0,0
  550 VDU23,225,63,5,255,255,15,2,7,7
  560 VDU23,226,228,4,244,252,244,4,4,0
  570 VDU23,227,126,60,24,60,60,60,60,24
  580 VDU23,228,60,60,24,126,153,36,66,129
  590 VDU23,229,189,189,153,126,24,36,66,129
  600 VDU23,230,0,24,60,126,126,90,90,126
  610 VDU23,231,126,90,90,126,126,90,90,12
  620 VDU23,232,0,0,50,126,126,90,90,126
  630 VDU23,233,255,255,255,255,255,255,255,255
  640 PLANE$=CHR$(224)+CHR$(225)+CHR$(226)
  650 SCORE%=0::PX%=1:PY%=3:BX%=0:BY%=0:BOMB%=0:N%=4
  660 DEF FNS(X,Y,N)=HIMEM+(Y*40+X)*8+N
  670 ENDPROC
  680 DEFPROCinst
  690 CLS:VDU19,3,9,0,0,0:PRINTTAB(5,14);"Do you need instructions (Y/N) ?"
  700 A$=GET$:IFA$="Y"GOTO710 ELSEIFA$="N"GOTO 790 ELSEGOTO700
  710 CLS:VDU19,1,3,0,0,0:COLOUR1:PRINTTAB(13,1);"B O M B E R"
  720 PRINT'''" Try to land your ancient fighter plane"
  730 PRINT'" by destroying all the city skyscrapers"
  740 PRINT'" to create a makeshift runway!"
  750 PRINT''" Bombs are dropped by pressing any key."
  760PRINT''" WARNING - your fuel is limited!!"
  770 PRINT'''''"    PRESS ANY KEY TO START YOUR FLIGHT"
  780 A$=GET$
  790 CLS:PRINTTAB(5,12);"What is your skill level  (1-3)?"
  800 A$=GET$:SK%=VAL(A$):IFSK%>3ORSK%<1GOTO790 ELSEENDPROC
  810 DEFPROCtitle
  820 CLS:VDU19,0,0,0,0,0,19,3,2,0,0,0
  830 TL$="B O M B E R":FORL%=1TOLEN(TL$):COLOUR3:PRINTTAB(L%+3,10);" ":PLANE$:F
ORB%=1TO4
  840 COLOUR2:PRINTTAB(L%+5,11+B%);" ";CHR$(10);CHR$(8);CHR$(227):SOUND1,-15,B%*
2,1:NEXTB%:COLOUR1:PRINTTAB(L%+5,16);MID$(TL$,L%,1);:SOUND0,-15,5,1:FORD%=1TO100
:NEXTD%:NEXTL%
  850 FORL%=1TO12000:NEXTL%:ENDPROC
```

ALIEN ATTACK

BY R. PHELPS

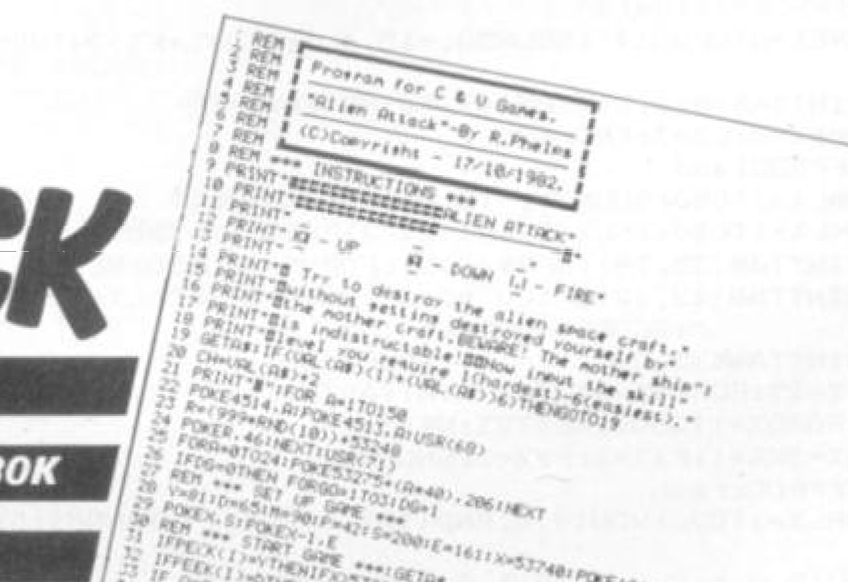
RUNS ON A SHARP MZ80K

IN 16K

A vast fleet of alien craft is sweeping majestically toward your tiny space fighter — the only surviving defender of a race doomed to destruction. Doomed unless you can stop the attackers.

You have to knock out the alien battleships one by one while their mother ship dodges up and down the screen attempting to wipe you off the face of the universe.

Unfortunately for you this mothership is invulnerable. But the following fleet can be destroyed. You simply need to be a good marksman.



S.O.S MISSION

BY NIGEL STUART

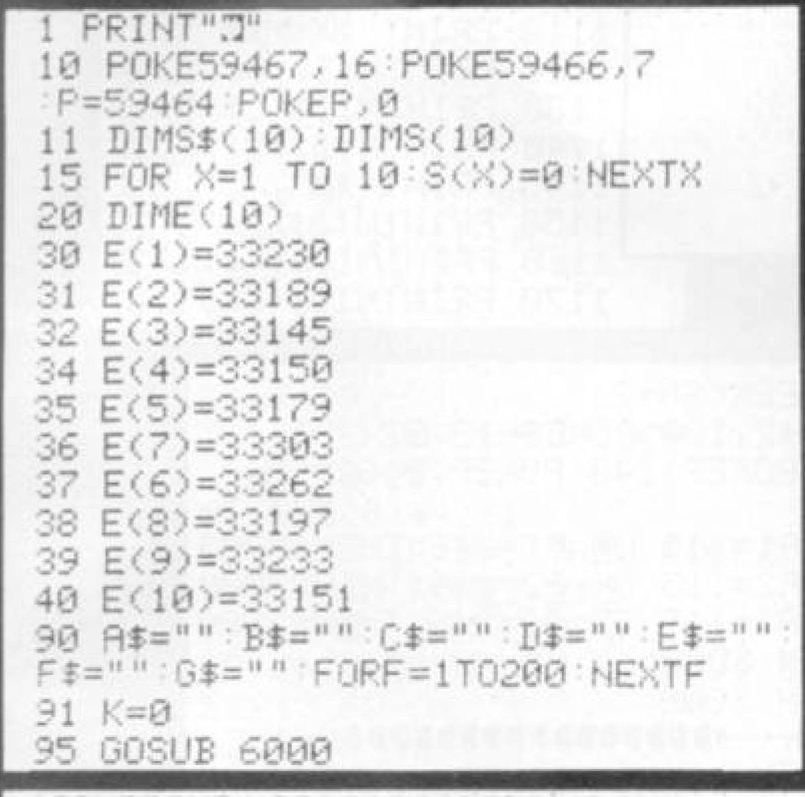
RUNS ON A 4000 SERIES PET

"Welcome captain. You are now in charge of the space fleet's newest most advanced battlecruiser. Your mission, should you accept it, is to pilot this craft into a tunnel on the enemy planet and destroy as many of their underground bases, ammunition and fuel dumps as possible . . ."

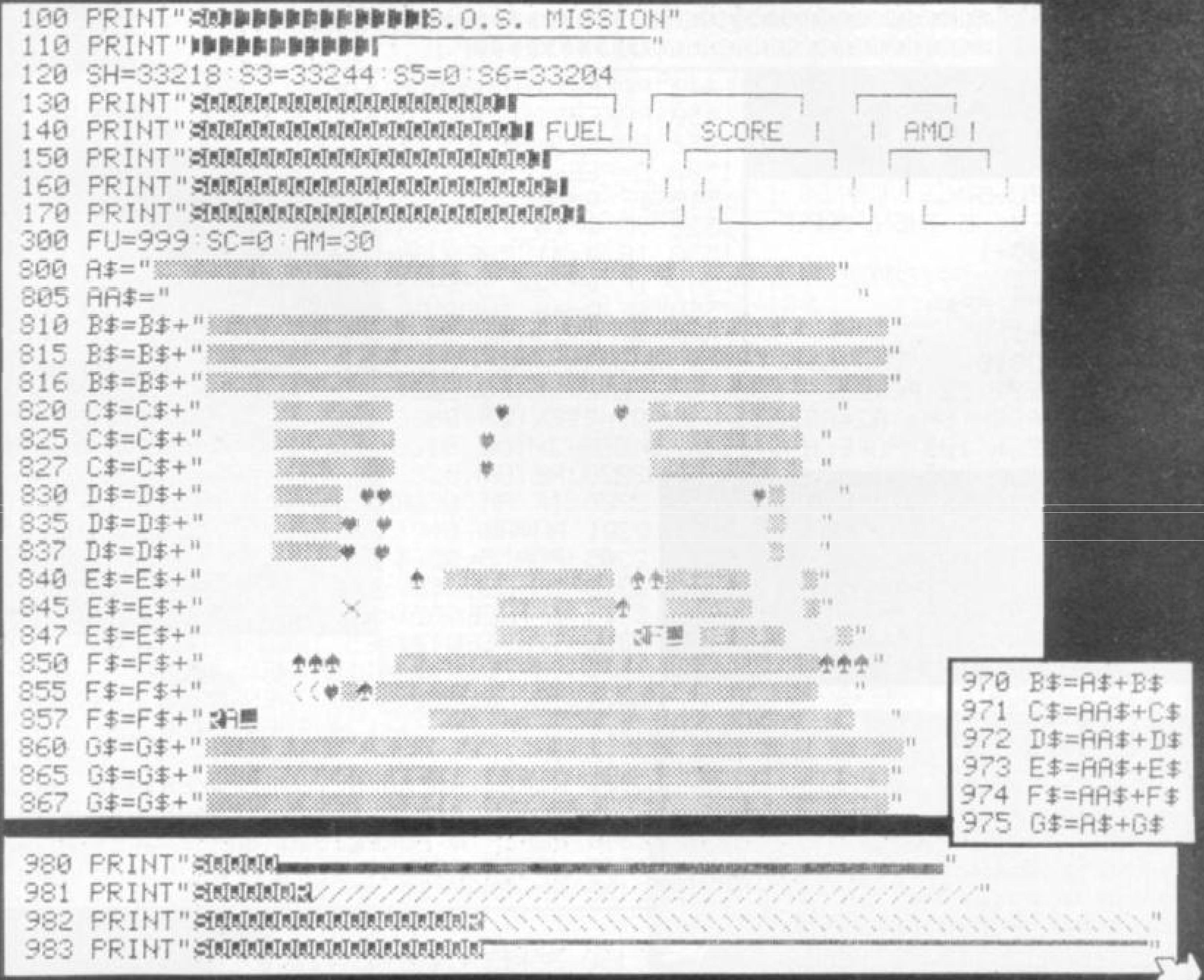
This is a version of arcade Scramble and all the rules of the video version apply. You gain extra fuel for your craft by bombing the fuel and ammunition dumps. Full instructions are included in the program.

To alter the program to run on a 3000 or 2000 series Pet the peek ot find which key is being pressed must be changed. This is peek 151 and the value is held in variable Q. The movement of the tunnels is held in B$, C$, D$, E$, F$, and G$.

IN 16K



```
1 PRINT"▮"
10 POKE59467,16:POKE59466,7
:P=59464:POKEP,0
11 DIMS$(10):DIMS(10)
15 FOR X=1 TO 10:S(X)=0:NEXTX
20 DIME(10)
30 E(1)=33230
31 E(2)=33189
32 E(3)=33145
34 E(4)=33150
35 E(5)=33179
36 E(7)=33303
37 E(6)=33262
38 E(8)=33197
39 E(9)=33233
40 E(10)=33151
90 A$="":B$="":C$="":D$="":E$="":
F$="":G$="":FORF=1TO200:NEXTF
91 K=0
95 GOSUB 6000
```



```
100 PRINT"▒▶▶▶▶▶▶▶▶▶▶▶▶▶S.O.S. MISSION"
110 PRINT"▶▶▶▶▶▶▶▶▶▶▶┌───────────────"
120 SH=33218:S3=33244:S5=0:S6=33204
130 PRINT"▒▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▶┌───────┐ ┌─────────┐ ┌────┐
140 PRINT"▒▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▶ FUEL ! ! SCORE  !  ! AMO !
150 PRINT"▒▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▶┌───────┐ ┌─────────┐ ┌────┐
160 PRINT"▒▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▶       ! !         ! !    !
170 PRINT"▒▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▶└──────┘ └─────────┘ └────┘
300 FU=999:SC=0:AM=30
800 A$="▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
805 AA$="                                         "
810 B$=B$+"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
815 B$=B$+"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
816 B$=B$+"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
820 C$=C$+"    ▒▒▒▒▒▒▒        ♥      ♥  ▒▒▒▒▒▒▒▒▒  "
825 C$=C$+"    ▒▒▒▒▒▒▒       ♥          ▒▒▒▒▒▒▒▒▒ "
827 C$=C$+"    ▒▒▒▒▒▒▒       ♥          ▒▒▒▒▒▒▒▒▒ "
830 D$=D$+"    ▒▒▒▒  ♥♥                      ♥▒    "
835 D$=D$+"    ▒▒▒▒♥ ♥                        ▒   "
837 D$=D$+"    ▒▒▒▒♥ ♥                        ▒   "
840 E$=E$+"         ♠ ▒▒▒▒▒▒▒▒▒▒ ♠♠▒▒▒▒▒   ▒"
845 E$=E$+"      ×       ▒▒▒▒▒▒▒♠ ▒▒▒▒▒   ▒"
847 E$=E$+"              ▒▒▒▒▒▒▒ ▒F▒ ▒▒▒▒▒   ▒"
850 F$=F$+"  ♠♠♠    ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒♠♠♠"
855 F$=F$+"  ((♥▒♠▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒   "
857 F$=F$+"▒A▒          ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒   "
860 G$=G$+"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
865 G$=G$+"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
867 G$=G$+"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
```

```
970 B$=A$+B$
971 C$=AA$+C$
972 D$=AA$+D$
973 E$=AA$+E$
974 F$=AA$+F$
975 G$=A$+G$
```

```
980 PRINT"▒▼▼▼▼▼▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄"
981 PRINT"▒▼▼▼▼▼▼▼////////////////////////////////////////"
982 PRINT"▒▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\"
983 PRINT"▒▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔▔"
```

```
990 FOR ZX=1 TO LEN(B$)-42
991 IF S5=38 THEN  GOSUB 2700
992 S9=S7:S7=S6-S8:IFS8=38 THEN GOSUB2751
993 S4=S3-S5:S5=S5+2:S8=S8+2
994 LL=INT(RND(0)*3)-1:S7=S7+(LL*40)
995 POKES4,115:POKES4+1,246:POKES4+3,
32:POKES4+2,32
996 IF K>0 THEN POKES7,60:POKES7+1,92:
POKES7+2,32:POKES7+3,32
999 IF K>0 THEN POKES7,60:POKES7+1,92:
POKES7+2,32:POKES7+3,32
```

```
1000 B$=MID$(B$,2,LEN(B$))
1010 C$=MID$(C$,2,LEN(C$))
1020 D$=MID$(D$,2,LEN(D$))
1030 E$=MID$(E$,2,LEN(E$))
1040 F$=MID$(F$,2,LEN(F$))
1050 G$=MID$(G$,2,LEN(G$))
1110 PRINT"§▼▼▼▼▼"
1120 PRINTMID$(B$,1,39)
1130 PRINTMID$(C$,1,39)
1140 PRINTMID$(D$,1,39)
1145 PRINT"▼▼"
1150 PRINTMID$(E$,1,39)
1160 PRINTMID$(F$,1,39)
1170 PRINTMID$(G$,1,39)
```

```
1180 A1=PEEK(SH):A2=PEEK(SH+1):A3=PEEK(SH+2)
1300 POKESH,108:POKESH+1,111:POKESH+2,100:POKESH+3,32
1310 POKEP,210:POKEP,180:POKEP,230:POKEP,240:POKEP,0:S2=SH
1320 IF B>1 THEN SH=SH-1:B=B-1
1350 IF A1=102 OR A1=83 OR A1=65 ORA1=115 OR A1=246 THEN 3000
1360 IF A2=102 OR A2=83 OR A2=65 ORA2=115 OR A2=246 THEN 3000
1370 IF A3=102 OR A3=83 OR A3=65 ORA3=115 OR A3=246 THEN 3000
1380 IF A1=86 OR A2=86 OR A3=86 THEN 3000
1390 IF A1=60 OR A2=60 OR A3=60 THEN 3000
1400 PRINT"§▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▶▶▶▌←←▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▌←"
1410 PRINT"§▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▶▶▌"FU
1420 PRINT"§▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▌"AM
1430 PRINT"§▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▶▶▶▶▶▶▶▶▶▶▶▌"SC
```

```
1440 POKEE(INT(RND(0)*10)+1),86
1450 POKEE(INT(RND(0)*10)+1),32
1460 POKES9,32:POKES9+1,32
1500 Q=PEEK(151)
1510 IF Q=50 THEN SH=SH-40:GOSUB2100
1520 IF Q=18 THEN SH=SH+40:GOSUB2100
1530 IF Q=41 THEN SH=SH+2:GOSUB2100:B=B+2
1540 IF B=>22 THEN B=B-1:SH=SH-1
1550 IF Q=48 THEN PP=0:GOSUB2300
1560 IF Q=32 THEN PP=0:GOSUB2400
```

```
1600 FU=FU-5
1610 IF FU<-5 THEN 3000
1999 SC=SC+1
2000 NEXTZX
2005 A$="":AA$=""
2006 K=K+1
2010 GOTO810
2100 POKES2,32:POKES2+1,32:POKES2+2,32:POKES2+3,32
2110 A1=PEEK(SH):A2=PEEK(SH+1):A3=PEEK(SH+2)
2210 POKESH,108:POKESH+1,111:POKESH+2,100
```

```
2220 RETURN
2300 IF AM<1 THEN RETURN
2301 AM=AM-1
2305 FOR Z=S2+4 TO S2+10
2310 IF PEEK(Z)=102 THEN PP=1:GOTO2390
2311 IF PEEK(Z)=83 THEN 2800
2312 IF PEEK(Z)=65 THEN 2900
2313 IF PEEK(Z)=115 THEN 4000
2314 IF PEEK(Z)=129 THEN 3300
2315 IF PEEK(Z)=134 THEN 3400
2316 IF PP=1 THEN 2390
2320 POKEZ,46:POKEP,140:POKEP,142
2330 POKEA,46:POKEP,190:POKEP,200
2340 POKEP,0:POKEZ,32
2390 NEXTZ:RETURN
2400 AM=AM-1:IF AM<0 THEN RETURN
```

```
2410 Z=SH+3
2420 Z=Z+40
2421 IF PEEK(Z)=102 THEN 2500
2422 IF PEEK(Z)=83 THEN 2800
2423 IF PEEK(Z)=65 THEN 2900
2424 IF PEEK(Z)=115 THEN 4000
2425 IF PEEK(Z)=129 THEN 3300
2426 IF PEEK(Z)=134 THEN 3400
2430 POKEZ,81:POKEP,100
2435 FORZZ=1TO4:POKEP,200:POKEP,180:POKEP,110:NEXTZZ
```

➜

```
2440 POKEP,0:FORZZ=1TO20:NEXTZZ:POKEZ,32
2490 GOTO 2420
2500 RETURN
2700 POKES4,32:POKES4+1,32:POKES4+2,32:POKES4+3,32:POKES4+4,32
2710 S5=0:L=INT(RND(0)*3)
2720 S3=33164+(L*40)
2750 RETURN
2751 S8=0:L=INT(RND(0)*3)
2752 S6=33164+(L*40)
2753 POKES9,32:POKES9+1,32:POKES9+2,32:POKES9+3,32:POKES9+4,32
2755 RETURN
2800 FOR F=1 TO 25
2810 J=INT(RND(0)*4)
2820 POKEP,J*25:IF J=1 THEN POKEZ,86
2830 IF J=2 THEN POKEZ,214
2840 IF J=3 THEN POKEZ,32
2850 POKEP,J+20
2860 NEXTF:POKEP,0:SC=SC+1000:RETURN
2900 FOR X=1 TO 25
2910 J=INT(RND(0)*4)+1
2920 POKEP,J*10:IF J=1 THEN POKEZ,87
2930 IF J=2 THEN POKEZ,215
2940 IF J=3 THEN POKEZ,32
2950 POKEP,J*20+50:NEXTX:POKEP,0:SC=SC+500:RETURN
3000 POKES2+3,32
3005 FOR Z=1 TO 10
3010 POKEP,210:POKES2,32:POKES2+1,32:POKES2+2,160:POKEP,0
3015 POKEP,170:POKES2,32:POKES2+1,32:POKES2+2,102:POKEP,0
3020 POKEP,180:POKES2,32:POKES2+1,160:POKES2+2,32:POKEP,0
3025 POKEP,250:POKES2,32:POKES2+1,102:POKES2+2,32:POKEP,0
3030 POKEP,240:POKES2,160:POKES2+1,32:POKES2+2,32:POKEP,0
3035 POKEP,125:POKES2,102:POKES2+1,32:POKES2+2,32:POKEP,0
3040 NEXTZ
3050 POKES2,32:POKES2+1,32:POKES2+2,32
3100 FOR X=32768TO33767STEP4
3110 Z=PEEK(X)
3120 IF Z<128 THENZ=Z+128:GOTO3140
3130 IF Z>128 THENZ=Z-128
3140 POKEX,Z:NEXTX
3250 FORF=1TO800:NEXTF:PRINT"♥"
3260 GOTO 4500
3300 FOR X=1 TO 50
3310 J=INT(RND(0)*4)
3320 IF J=1 THEN POKEZ,1:POKEP,210:POKEP,180
3330 IF J=3 THEN POKEZ,129:POKEP,170:POKEP,240
3340 NEXTX
3350 AM=AM+10
3390 RETURN
3400 FOR X=1 TO 50
3410 J=INT(RND(0)*4)
3420 IF J=1 THEN POKEZ,134:POKEP,150:POKEP,110
3430 IF J=3 THEN POKEZ,6:POKEP,110:POKEP,190
3440 NEXTX
3450 FU=FU+100:RETURN
4000 FORX=1 TO 10
4005 POKEZ,INT(RND(0)*250):POKEZ+1,32
4010 J=INT(RND(0)*4)
4020 POKEP,J*20:IFJ=1THENPOKEZ-41,43
4030 IFJ=2THENPOKEZ-41,171
4040 IFJ=3THENPOKEZ-41,32
4060 POKEP,J*25:IFJ=1THENPOKEZ-39,43
4070 IFJ=2THENPOKEZ-39,171
4080 IFJ=3THENPOKEZ-39,32
4100 POKEP,J*15:IFJ=1THENPOKEZ+39,43
```

```
4110 IFJ=2THENPOKEZ+39,171
4120 IFJ=3THENPOKEZ+39,32
4140 POKEP,J*10:IFJ=1THENPOKEZ+41,43
4150 IFJ=2THENPOKEZ+41,171
4160 IFJ=3THENPOKEZ+41,32
4170 NEXTX:POKEP,0
4180 POKEZ-39,32:POKEZ-41,32:POKEZ+41,32:POKEZ+39,32:POKEZ,32
4190 S5=0:L=INT(RND(0)*3)
4200 S3=33164+(L*40):SC=SC+250
4210 RETURN
4500 REM ****** END *******
4501 GETN$:PRINT"⌂"N$:IF N$<>"" THEN 4501
4510 PRINT"♥"
4520 PRINT"▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶RGAME OVER"
4530 PRINT"▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶──────────"
4540 PRINT"⊠⊠▶▶▶▶▶▶▶▶▶▶▶▶▶YOU SCORED "SC
4550 FORX=1TO10:IFSC>S(X)THEN4570
4560 NEXTX:GOTO4700
4570 PRINT"⌂⊠⊠⊠⊠⊠⊠⊠⊠▶▶▶▶▶▶PLEASE ENTER YOUR NAME FOR THE "
4580 PRINT"⊠▶▶▶▶▶▶▶▶▶▶▶▶▶SCORE-TABLE."
4590 PRINT"⊠                           ♥"
4600 INPUTS$(X):S(X)=SC
4610 IF LEN(S$(X))>12 THEN 4570
4700 FOR F=1 TO 800:NEXTF:PRINT"♥"
4710 PRINT"⊠▶▶▶▶▶▶▶▶YOU JUST SCORED"SC
4720 PRINT"⊠⊠"
4730 FORX=1TO10
4740 PRINT"▶▶▶▶▶▶▶▶▶▶▶"S(X)"   "S$(X)
4750 POKEP,X*20
4760 FOR Z=1 TO 80:NEXTZ
4800 NEXTX
4805 POKEP,0
4810 PRINT"⊠⊠⊠▶▶▶▶▶▶▶▶▶▶▶R<PRESS RETURN>"
4820 IF PEEK(151)<> 27 THEN 4820
4900 GOTO90
5000 END
6000 REM ******** START ******
6001 GETN$
6005 GOTO 7010
6010 RESTORE:PRINT"♥":POKE59458,100
6015 PRINT"⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠⊠"
6020 READZ$:READZZ:POKEP,ZZ
6025 GETN$:IFN$<>"" THEN 7500
6030 IF Z$="┬" THEN 6980
6050 PRINTZ$
6060 PRINT
6100 FOR X=1 TO 20:POKEP,ZZ:POKEP,ZZ+10:NEXTX
6110 FOR X=1 TO 10:POKEP,ZZ+10:POKEP,ZZ-10:NEXTX
6120 POKEP,0:FORX=1TO500:NEXTX
6200 GOTO 6020
6980 POKEP,0:POKE59458,30
6990 POKE59458,30
7000 GOTO6000
7010 PRINT"♥":POKE59458,100:FORZ=1TO250:NEXTZ
7015 FOR X=1 TO 24
7017 GETN$:IFN$<>"" THEN 7500
7020 PRINTTAB(10)"S.O.S. MISSION ♥"
7030 FOR Z=1 TO 100 STEP11:POKEP,Z:NEXTZ:POKEP,0
7040 FOR Z=1 TO 40:NEXTZ
7050 PRINTTAB(10)" S.O.S. MISSION♥"
7060 FOR Z=100 TO 1 STEP-11:POKEP,Z:NEXTZ:POKEP,0
```

```
7070 FOR Z=1 TO 40:NEXTZ
7100 PRINTTAB(11)" S.O.S. MISSION ℸ"
7110 FOR Z=10 TO 200 STEP-14:POKEP,Z:NEXTZ:POKEP,0
7120 FOR Z=1 TO 60:NEXTZ
7125 GETN$:IFN$<>"" THEN 7500
7150 PRINTTAB(11)" S.O.S. MISSION ℸ"
7160 FOR Z=10 TO 200 STEP-14:POKEP,Z:NEXTZ:POKEP,0
7170 FOR Z=1 TO 40:NEXTZ
7180 PRINTTAB(10)" S.O.S. MISSION  ℸ"
7190 FOR Z=100 TO 1 STEP-11:POKEP,Z:NEXTZ:POKEP,0
7200 FOR Z=1 TO 40:NEXTZ
7210 PRINTTAB(10)"S.O.S. MISSION   ℸ"
7220 FOR Z=1 TO 100 STEP11:POKEP,Z:NEXTZ:POKEP,0
7230 FOR Z=1 TO 40:NEXTZ
7240 PRINTTAB(10)"                         "
7300 NEXTX
7400 GOTO 6010
7500 POKE59458,30:PRINT"ℸ▚▚▚▚▚▚▚▚▚▚▚▚▶▶▶▶▶▶▶▶▶▶▶▶<PRESS SPACE>":POKEP,0
7510 GET N$:IF N$<>" " THEN 7510
7520 PRINT"ℸ":RETURN
9000 DATA"              S.O.S. MISSION.",210
9010 DATA"             ______________________".190
9015 DATA"   (C) BY NIGEL STUART 29:8:1982.",180
9020 DATA" ",170
9030 DATA"     WELCOME CAPTAIN YOU ARE NOW PLACED",150
9040 DATA"  IN CHARGE OF OUR LATEST SPACE-CRAFT.",180
9050 DATA"  YOUR MISSION IS TO ENTER A TUNNEL",220
9060 DATA"  ON AN ALIEN PLANET AND DISTROY",150
9090 DATA"  AS MANY OF THERE UNDERGROUND",130
9100 DATA"  BASES, AMO DUMPS AND FUEL DUMPS ",240
9110 DATA"  AS YOU CAN BEFORE YOU RUN OUT OF FUEL.",240
9120 DATA"  ",100
9130 DATA" YOU MAY GAIN ▒EXTRA■ FUEL AND AMO BY",190
9140 DATA" BOMBING OR SHOOTING AMO AND FUEL DUMPS.",210
9150 DATA" THESE ARE SHOWN AS ▒A■ AND ▒F■.",80
9160 DATA" ",50
9170 DATA"   THE CONTROLS FOR THE SPACE-CRAFT",80
9180 DATA" ARE AS FOLLOWS :-",170
9190 DATA"  ",200
9200 DATA" 8 TO MOVE UP.",230
9210 DATA" 2 TO MOVE DOWN.",210
9220 DATA" 6 TO MOVE FORWARD.",190
9230 DATA"  ",170
9240 DATA" A TO FIRE FORWARD.",150
9250 DATA" Z TO DROP A BOMB.",110
9260 DATA" ",150
9270 DATA"          -------------------",180
9280 DATA" POINTS AWARDED FOR HITTING ",200
9290 DATA" ♠ = 500",90
9300 DATA" ♥ = 1000",80
9310 DATA" ┤▒ ■ =250",90
9320 DATA" YOU CAN NOT HIT <▒",80
9330 DATA" ▒A■ = 10 UNITS OF AMO",90
9340 DATA" ▒F■ = 100 UNITS OF FUEL".80
9350 DATA"          -------------------".180
9360 DATA" ",150
9370 DATA"    GOOD LUCK!! ",200
9380 DATA"  YOU WILLNOT BE ABLE TO RETURN BECAUSE",190
9390 DATA"  YOU WILL BE BLOWN UP.",210
9400 DATA"  BUT TRY TO GET AS FAR AS YOU CAN.",220
9410 DATA"  WE ARE COUNTING ON YOU.....",230
```

```
9420 DATA" ",240
9430 DATA" ",210
9440 DATA" ",180
9450 DATA" ",150
9460 DATA" ",110
9470 DATA" ",80
9480 DATA" ",50
9490 DATA" ",20
9500 DATA" ",245
9510 DATA" ",245
9520 DATA" ",245
9530 DATA" ",10
9999 DATA "┬",0
```

COPY

```
 1REM BY neil devlin SEPT1982
 2P.#12;?#E1=0;?#8000=32;P.''''''"                    coPy"''
 3P."                  BY"''"              NEIL DEVLIN"
 4F.D=1TO90;WAIT;N.
 5P.#12;?#8000=32
 6?#E1=0;P."               ** COPY **"
 7?#E1=0;P.''"REPEAT WHAT THE COMPUTER FLASHES"
 8?#E1=0;P."BY PRESSING NUMBERS 1 TO 4."
 9IN.''''             INPUT"''       1-FAST   SLOW-2 "O
10IF (O<1)|(O>2)G.3
11IF O=1 V=10;G.13
12O=20
13DIMBB47
14J=0;M=#8002
15 P.#21;DIM RR1,P-1;L=#FFE3
16[; RR0 JSR L;STA#80;RTS;];P.#6
17F=0;G=0;E=0;I=0
18F.D=0TO47
19A=A.R.%5;IFA=0 G.19
20BBD=A;N.
21CLEAR4
22GOS.c;COLOUR3
23GOS.50;F.D=1TO20;WAIT;N.
24GOS.45
25E=E+1;B=0;C=0
26GOS.39
27IFF=G GOS.b;GOS.a;G=G+1;E=0;C=0;F=0;F.D=1TO65;WAIT;N.;G.24
28F=F+1;C=0;G.24
29E.
30aLINK RR0
31IF(?#80>52)|(?#80<49) G.a
32IF?#80=49 I=I+1;J=1;X=10;COLOUR1
33IF?#80=50 I=I+1;J=2;X=40;COLOUR1
34IF?#80=51 I=I+1;J=3;X=70;COLOUR3
35IF?#80=52 I=I+1;J=4;X=100;COLOUR3
36B=0;C=0;GOS.39;IFBB(I-1)<>J G.68
37IFE=I I=0;F=0;COLOUR0;GOS.58;P.
38G.a
39REM DRAW SQUARE
40F.D=1TO3
41MOVE(X+B),75;WAIT;DRAW(X+B),80
42B=B+1;N.;IF C=1 GOS.55
43F.D=1TO O;WAIT;N.
44IFC=0;COLOUR0;B=0;C=1;G.39;R.
45IF BBE=1 X=10;COLOUR1;R.
46IF BBE=2 X=40;COLOUR1;R.
47IF BBE=3 X=70;COLOUR3;R.
48IF BBE=4 X=100;COLOUR3;R.
49E.
50REM DRAW NUMBERS
51MOVE11,60;DRAW11,65
52MOVE42,60;DRAW39,60;DRAW39,62;DRAW42,62;DRAW42,64;DRAW39,64
53MOVE70,60;DRAW73,60;DRAW73,64;DRAW70,64;MOVE70,62;DRAW73,62
54MOVE103,62;DRAW100,62;DRAW100,64;MOVE102,63;DRAW102,60;R.
55P.#7;R.
56bREM DRAW 'YOUR GO'
57COLOUR1
58MOVE35,150;DRAW39,150;DRAW39,158;MOVE39,154;DRAW35,154
59DRAW35,158
60MOVE43,150;DRAW47,150;DRAW47,158;DRAW43,158;DRAW43,150
61MOVE51,158 ;DRAW51,150;DRAW55,150;DRAW55,158
62MOVE59,150;DRAW59,158;DRAW62,158 ;DRAW63,157;DRAW63,154
63MOVE63,154;DRAW59,154;MOVE61,154;DRAW63,150
64MOVE70,158;DRAW75,158;DRAW74,157;DRAW74,151;DRAW75,150
65DRAW77,150;DRAW78,151;DRAW78,153;DRAW77,153
66MOVE82,150;DRAW86,150;DRAW86,158;DRAW82,158;DRAW82,150
67R.
68P.#12;?#E1=0;?#8000=32
69P.'''''''"              TUT-TUT"'"          WRONG CHOICE"
70IN.'''''''"   ANOTHER GAME (1-NO YES-2)"Z
71IF Z=2 G.74
72P.#12;?#E1=0;?#8000=32;P.''''''''"              BYE-COWARD"
73G.73
74P.#12;?#E1=0;P.''''' "O.K I'LL GIVE YOU ANOTHER CHANCE"
75?#8000=32;G.9
76cREM DRAW 'COPY'
77COLOUR3
78MOVE56,190;DRAW54,190;DRAW54,186;DRAW56,186
79MOVE58,190;DRAW58,186;DRAW60,186;DRAW60,190;DRAW58,190
80MOVE62,188;DRAW64,188;DRAW64,190;DRAW62,190;DRAW62,186
81MOVE66,190;DRAW66,188;DRAW68,188;MOVE68,190;DRAW68,186
82DRAW66,186;R.
```

COPY

BY NEIL DEVLIN

RUNS ON AN ATOM IN 12K

How good are your powers of concentration and memory?

Not very good, then let Copy hone them to razor sharpness as the Atom displays in hi-res graphics an ever increasing sequence of numbers for you to remember. One wrong one and you have to start all over again from scratch.

For those of you thinking you are superior there is a fast mode designed to take the smirk off your face and bring you back to reality.

Based upon the Simon game, Copy is written for an expanded Atom.

GHOSTS

How long can you evade the nasty little ghosts that pursue relentlessly around the screen? Your only chance is to force the ghosts to step onto anti-matter spots.

First there will be one ghost after you and when he has been disposed of two more will appear to carry on the evil job. When the two have gone three will appear, then four, five . . .

Watch out that you do not get caught by them or step onto an anti-matter spot or you will come to a nasty end!

This program uses all three of the Spectrum's best requisites — sound, colour, and user-defined graphics — to make up an exciting arcade type game.

When run the computer sets up the screen and waits for you to press a key before starting. Your little man is moved by the cursor keys.

BY IAN McATAMNEY

RUNS ON A SPECTRUM IN 16K

```
  10 GO SUB 620
  15 REM MAIN LOOP
  20 FOR g=1 TO 20
  30 IF g>1 THEN PRINT AT 11,4;
PAPER 3; FLASH 1;" Made it! ";g;
" ghosts now ": PAUSE 200: FOR j
=1 TO 5: BEEP .1,30: NEXT j: PAU
SE 200
  40 LET m=0
  50 GO SUB 520
  55 REM SET UP ANTIMATTER
  60 FOR j=1 TO 10
  70 PRINT AT INT (RND*20) +1, INT
 (RND*30) +1; INK 5; "●"
  80 NEXT j
  85 REM SET UP PLAYER & GHOSTS
  90 LET a=INT (RND*21) +1
 100 LET b=INT (RND*31) +1
 110 DIM a(g,2): DIM b(g,2)
 120 FOR j=1 TO g
 130 LET a(j,1)=INT (RND*21) +1
 140 LET a(j,2)=INT (RND*31) +1
 150 NEXT j
 160 LET c=a: LET d=b
 170 GO SUB 420
 180 PRINT AT 0,0; PAPER 2;" "
 190 PAUSE 0
 195 REM MOVEMENT LOOP
 200 FOR k=1 TO 3
 210 LET c=a
 220 LET d=b
 225 REM PLAYER MOVEMENT
 230 LET a=a+(INKEY$="6" AND a<2
1)-(INKEY$="7" AND a>1)
 240 LET b=b+(INKEY$="8" AND b<3
1)-(INKEY$="5" AND b>0)
 245 REM GHOST MOVEMENT
```

```
250 FOR j=1 TO g
260 IF j>g THEN GO TO 370
270 IF m=g THEN NEXT g
280 IF a(j,1)=200 THEN NEXT j
290 IF j>g THEN GO TO 370
300 LET b(j,1)=a(j,1): LET b(j,
2)=a(j,2)
310 IF k=3 THEN GO TO 340
320 LET a(j,1)=a(j,1)+(a(j,1)<a
)-(a(j,1)>a)
330 LET a(j,2)=a(j,2)+(a(j,2)<b
)-(a(j,2)>b)
340 IF ATTR (a(j,1),a(j,2))=13
THEN PRINT AT b(j,1),b(j,2);" ":
BEEP .05,5: LET a(j,1)=200: LET
m=m+1
350 IF a(j,1)=a AND a(j,2)=b TH
EN GO TO 580
360 NEXT j
370 IF m=g THEN NEXT g
380 IF ATTR (a,b)=13 THEN GO TO
540
390 GO SUB 420
400 NEXT k
410 GO TO 200
415 REM PRINT SCREEN
420 PRINT AT c,d;" ";AT a,b;"▲"
430 BEEP .02,-20
440 PRINT AT 0,0; PAPER 2;"
 Ghosts left:";g-m;"
 "
450 FOR j=1 TO g
460 IF a(j,1)=200 THEN NEXT j
470 IF j>g THEN RETURN
480 IF ATTR ((a(j,1)),(a(j,2)))
=14 THEN LET a(j,1)=b(j,1): LET
a(j,2)=b(j,2)
490 PRINT AT b(j,1),b(j,2);" ";
AT a(j,1),a(j,2); INK 6;"▲"
```

```
500 NEXT j
510 RETURN
520 PAPER 1: INK 7: CLS : BORDE
R 0
530 RETURN
535 REM END GAME
540 PRINT AT c,d;" ";AT a,b; FL
ASH 1; INK 2;"●"
550 PRINT AT 0,0; PAPER 4; INK
0; FLASH 1;" Fool, you went onto
 antimatter "
560 BEEP 2,-45
570 PAUSE 0: PAUSE 0: RUN
580 PRINT AT b(j,1),b(j,2);" ";
AT c,d; INK 2;"▲"
590 PRINT AT 0,0; PAPER 4; INK
0; FLASH 1;"   Got you this t
ime "
600 BEEP 2,-45
610 PAUSE 0: PAUSE 0: RUN
615 REM USER-DEFINED GRAPHICS
620 FOR j=0 TO 7: READ p: POKE
USR "a"+j,VAL ("BIN "+STR$ p): N
EXT j
630 FOR j=0 TO 7: READ p: POKE
USR "b"+j,VAL ("BIN "+STR$ p): N
EXT j
640 FOR j=0 TO 7: READ p: POKE
USR "c"+j,VAL ("BIN "+STR$ p): N
EXT j
650 RETURN
660 DATA 10000,111000,10000,111
1100,10000,10000,101000,1000100,
111000,1111100,1010100,11010110,
11111110,1111110,11011010,10010
010,111100,1111110,11111111,1111
1111,11111111,11111111,1111110,1
11100
```

```
1 PRINT"▒";
5 S$="▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
10 DATA53249,53413,53536,53618
15 DATA53268,53424,53541,53619
20 DIMCL(2,4):FORI=1TO2:FORJ=1TO4:READCL(I,J)
:NEXTJ,I
25 DATA20,12,6,2
30 FORI=1TO200:TV=RND(1):NEXT
35 LI=6+INT(RND(1)*5):LJ=6+INT(RND(1)*5):DR
=INT(RND(1)*4+1):CI=LI:CJ=11-LJ
40 DIMDW(4):FORI=1TO4:READDW(I):NEXT
50 DIMDL(2,2):DL(1,1)=119:DL(1,2)=118:DL(2,1)=
118:DL(2,2)=119
55 DIMVL(2):VL(1)=61:VL(2)=113
60 DIMDR(4):FORI=1TO4:READDR(I):NEXT
65 DATA2,3,5,7
71 DATA14,15,42,14,10,10,2,6,14,6
72 DATA21,14,15,21,70,10,15,21,21,21
73 DATA21,21,14,5,10,10,2,15,21,21
74 DATA7,3,35,10,10,6,35,10,15,21
75 DATA21,35,10,10,6,21,14,10,10,15
76 DATA105,14,10,10,15,105,35,10,10,6
77 DATA70,5,10,10,10,2,10,2,10,15
78 DATA14,10,10,10,10,3,42,7,10,30
79 DATA35,10,2,6,70,15,21,21,70,6
80 DATA70,10,15,35,10,10,5,5,10,15
81 DATA42,14,10,2,10,15,14,10,10,6
82 DATA21,35,30,21,14,10,5,10,6,21
83 DATA35,10,6,21,21,14,10,6,21,21
84 DATA14,6,21,21,21,35,6,21,21,21
85 DATA21,105,21,21,35,10,15,21,21,21
86 DATA35,10,3,35,10,10,10,15,105,21
87 DATA14,10,5,6,14,6,14,10,10,15
88 DATA21,14,6,105,21,21,35,10,10,6
89 DATA21,21,7,10,15,21,14,10,30,21
90 DATA35,15,35,10,10,5,5,10,10,15
91 DATA14,10,10,6,21,14,2,10,6,42
92 DATA21,14,6,21,35,15,21,42,21,21
93 DATA21,42,21,21,14,2,15,21,35,15
94 DATA7,2,3,21,21,21,14,3,14,6
95 DATA21,21,105,21,21,21,21,35,15,21
96 DATA21,35,10,15,21,35,5,10,10,3
97 DATA35,10,10,10,5,10,2,10,6,21
98 DATA42,70,10,2,10,6,21,42,35,15
99 DATA7,21,2,3,14,5,5,5,10,6
100 DATA105,70,15,105,35,10,10,30,70,15
129 REM =* INSTRUCTIONS *=
130 PRINT"\                        /"
131 PRINT" \                      /"
132 PRINT"  \       3  -  D      /"
133 PRINT"   \    ==========    /"
```

3D MAZE

BY MATTHEW BLAKSTAD

RUNS ON AN MZ80K IN 7K

Baffled, bothered and bewildered? No? Well you will be after trying to find your way out of 3D-Maze!

You'll find yourself in an impressive graphic representation of a mindbending maze once you've programmed in all the twists and turns. All you have to do is escape.

The program enables you to move left, right, and forwards, and even to execute a neat little 180 degree "flip" as you attempt to work out which way the exit is.

When the elusive exit is in sight a letter 'E' appears on the screen. A musical jingle greets your successful escape and the computer displays the time it took you to get out of its mysterious maze. See you soon — we

Variables/arrays

CL(2,4): corner location on screen of walls. TV: temporary variable. LI, LJ: co-ordinates of player. TI, TJ: temporary co-ordinates for printout. SI, SJ: co-ordinate for finding side location. DR: direction in which player is facing. CI, CJ: co-ordinates for printout at end of game. DW, (4): depth of wall for each distance. DL (2,2): codes of diagonal line graphics. VL (2): codes of vertical line graphics.

DR (4): prime number for testing the presence of a wall. S: horizontal space string. I&J: loop variables. (also X). A$: temporary string variable. MS (10,10):number of each cell for testing for the presence of a wall. MZ: choice of maze. TI$: MZ-80K time string. CA: advancement of cell from (TI,TJ). SD: side being tested for a wall.

OV: other temporary variable. TN: direction of turn/correct input test. PP: position of poke (location). C1: left hand corner for facing wall. C2: right hand corner for facing wall. WH: wall height for facing wall. DW: wall depths for walls in adjacent cells.

```
134 PRINT"    |           /| "
135 PRINT"    |          / | "
136 PRINT"    └──       /  | "
137 PRINT"    |  |\    |   | "
138 PRINT"    |  | \ _|   | "
139 PRINT"    |  | ┌─┘ |   | "
140 PRINT"    |  | /─┐ |   | "
141 PRINT"    |  | /  ─┐   | "
142 PRINT"    |  V     |   | "
143 PRINT"    ┌──      \   | "
144 PRINT"    |  M A Z E \ | "
145 PRINT"    | ========== V "
146 PRINT"    /            \"
147 PRINT"   /              \"
148 PRINT"  /                \"
149 PRINT"/                  \"
150 TEMPO7:FORJ=1TO5:FORI=1TO5:MUSIC"_D0_E0"
:NEXT:FORI=1TO5:MUSIC"_D0_C0"
155 NEXTI,J
160 PRINT"□":PRINTS$:"Find your way"
161 PRINTS$:"through a"
162 PRINTS$:"perspective view"
163 PRINTS$:"□of one of three"
164 PRINTS$:"mazes,using the"
165 PRINTS$:"commands listed."
166 PRINT:PRINT:PRINTS$:"N.B. The cell"
167 PRINTS$:"nearest to you"
168 PRINTS$:"is the one"
169 PRINTS$:"which you are"
170 PRINTS$:"in."
180 PRINT:PRINT:PRINT:PRINTS$:"PRESS ANY KEY"
190 GET A$:IFA$=""THEN190
250 PRINT"▨SELECT MAZE (1-3)"
260 GETA$:IF(VAL(A$)=0)+(VAL(A$)>3)THEN260
265 PRINT"▨"
270 DIMMS(10,10):FORX=1TOVAL(A$):FORI=1TO10:
FORJ=1TO10:READMS(I,J):NEXTJ,I,X
280 MZ=VAL(A$)
290 POKE59555,0
295 TI$="000000"
299 REM =* DISPLAY LOOP *=
300 TI=LI:TJ=LJ:FORCA=1TO4
309 REM =* LEFT & RIGHT WALLS *=
310 FORSD=1TO2
320 OV=DR+(3-2*SD):IFOV=0THENOV=4
325 IFOV=5THENOV=1
330 TV=MS(TI,TJ)/DR(OV)
335 IFINT(TV)<>TVTHEN1050
340 FORI=CL(SD,CA)TOCL(SD,CA)+(43-2*SD)*(4-
CA)STEP(43-2*SD)
345 POKEI,DL(SD,1):NEXT
347 IFCA=4THENI=CL(SD,CA)+40:GOTO360
350 TV=I+(SD*2-3):FORI=TVTOTV+40*(DW(CA)-2*
(4-CA)-3)STEP40:POKEI,VL(SD):NEXT
360 TV=I:FORI=TVTOTV+(37+2*SD)*(4-CA)STEP
(37+2*SD):POKEI,DL(SD,2):NEXTI
370 FORI=CL(SD,CA)+(2*SD-3)TOCL(SD,CA)+
(2*SD-3)+40*DW(CA)-40STEP40
380 POKEI,VL(SD):NEXTI
381 NEXTSD
385 IFCA=4THEN450
390 TV=MS(TI,TJ)/DR(DR)
400 IFINT(TV)=TVTHEN1000
410 IFDR=1THENTI=TI-1:IFTI=0THENPOKECL
(1,4),5:GOTO700
420 IFDR=2THENTJ=TJ+1
430 IFDR=3THENTI=TI+1
440 IFDR=4THENTJ=TJ-1
450 NEXTCA
700 POKE59555,1:PRINT"□":S$:"   Your move"
710 PRINTS$:"   ==== ===="
720 PRINT:PRINT:PRINTS$:"L=Left   R=Right"
730 PRINT:PRINTS$:"F=Flip    M=Move"
740 PRINT:PRINT:PRINTS$:"         ▨"
750 GETA$:IFA$=""THEN750
760 PRINT"□":S$:"          ":A$
770 IFA$="L"THENTN=1
780 IFA$="R"THENTN=-1
790 IFA$="F"THENTN=2
800 IFA$="M"THEN850
810 IFTN=0THEN750
820 DR=DR+TN:IFDR=0THENDR=4
830 IFDR>4THENDR=DR-4
840 TN=0:PRINT"▨":POKE59555,0:GOTO300
850 IFMS(LI,LJ)/DR(DR)=INT(MS(LI,LJ)/DR(DR)
)THENMUSIC"C0":GOTO750
855 IFDR=1THENLI=LI-1:IFLI=0THEN900
860 IFDR=2THENLJ=LJ+1
870 IFDR=3THENLI=LI+1
880 IFDR=4THENLJ=LJ-1
890 GOTO840
900 FORI=1TO200:POKE4514,INT(RND(1)*50):USR
(68):NEXT:USR(71)
910 PRINT"▨":
920 ONMZGOSUB1180,1400,1620
930 PRINT"□□□□□□□□□□":S$:"STARTING"
935 PRINTS$:"CO-ORDS :-"
940 PRINT:PRINTS$:"(":CI:" ,":CJ:" )"
945 PP=53207+80*CI+2*CJ
950 POKEPP,202
955 PRINT:PRINT:PRINTS$:"Time:-":VAL(MID$
(TI$,3,2)):" mins."
960 PRINT:PRINT:PRINTS$:"▨▨ANOTHER GAME?"
965 GET A$:IF A$=""THEN965
970 IFA$="Y"THENPRINT"YES":FORI=1TO500:NEXT:
RESTORE:GOTO1
980 PRINT"NO":END
999 REM =* FACING WALL DISPLAY *=
1000 C1=CL(1,CA)+(5-CA)*41:C2=CL(2,CA)+(5-CA)
*39:WH=DW(CA)-2*(5-CA)-1
1005 FORI=C1TOC2:POKEI-40,60:NEXTI
1010 FORI=0TOWH:POKEC1+40*I,VL(2):POKEC2+40*
I,VL(1):NEXT
1020 FORI=C1+40*WHTOC2+40*WH:POKEI+40,112:NEXT
1030 GOTO700
1049 REM =* SPACE TO SIDE *=
1050 SI=TI:SJ=TJ
1060 IFOV=1THENSI=SI-1:IFSI=0THEN381
1070 IFOV=2THENSJ=SJ+1
1080 IFOV=3THENSI=SI+1
1090 IFOV=4THENSJ=SJ-1
1100 TV=MS(SI,SJ)/DR(DR)
1110 IFINT(TV)<>TVTHENGOTO381
1120 DW=DW(CA)-2*(5-CA):CL=CL(SD,CA)+40*(4-CA):DM=3-2*SD
1130 FORI=CLTOCL+DM*(4-CA)STEPDM:POKEI,60:NEXTI
1140 I=I+(37+2*SD):IFCA=4THEN1160
1150 TV=I:FORI=TVTOTV+40*(DW-1)STEP40:POKEI,VL(SD):NEXTI
1160 TV=I:FORI=TVTOTV+(-DM)*(4-CA)STEP-DM:POKEI,112:NEXT
1170 GOTO381
1180 PRINT"█████████████████ ███"
1190 PRINT"█   █         █ █   █"
1200 PRINT"█ █ █ █ █████ █ ███ █"
1210 PRINT"█ █ █ █     █ █   █ █"
1220 PRINT"█ █ █ ███████ ███ █ █"
1230 PRINT"█ █ █           █ █ █"
1240 PRINT"█ █ ███ ███████ █ █ █"
1250 PRINT"█ █     █       █   █"
1260 PRINT"█ ███████ ███████ █ █"
1270 PRINT"█       █ █       █ █"
1280 PRINT"███████ █ █ ███████ █"
1290 PRINT"█       █ █       █ █"
1300 PRINT"█ ███████████████ ███"
1310 PRINT"█                   █"
1320 PRINT"█████ ███ ███████████"
1330 PRINT"█     █ █           █"
1340 PRINT"█████ █ █ █████████ █"
1350 PRINT"█   █ █ █   █       █"
1360 PRINT"█ ███ █ █████ █ █████"
1370 PRINT"█             █     █"
1380 PRINT"█████████████████████"
1390 RETURN
1400 PRINT"█████████ ███████████"
1410 PRINT"█       █         █ █"
1420 PRINT"█ █████ █████ ███ █ █"
1430 PRINT"█ █         █ █   █ █"
1440 PRINT"█ █ ███████ █ █████ █"
1450 PRINT"█ █ █     █ █ █     █"
1460 PRINT"█ █ █ ███ █ █ █ █████"
1470 PRINT"█ █ █ █   █ █ █ █   █"
1480 PRINT"█ █ █ █ ███ █ █ █ █ █"
1490 PRINT"█ █ █ █     █ █ █ █ █"
1500 PRINT"█ █ █ ███████ █ ███ █"
1510 PRINT"█ █ █         █     █"
1520 PRINT"█ █████████████ █████"
1530 PRINT"█       █   █       █"
1540 PRINT"███████ █ █ █ █████ █"
1550 PRINT"█       █ █ █ █   █ █"
1560 PRINT"█ ███████ █ ███ █ █ █"
1570 PRINT"█ █     █ █     █ █ █"
1580 PRINT"█ █████ █ █████ █ █ █"
1590 PRINT"█               █   █"
1600 PRINT"█████████████████████"
1610 RETURN
1620 PRINT"███████████ █████████"
1630 PRINT"█ █       █ █       █"
1640 PRINT"█ █ ███ █ █ █ █████ █"
1650 PRINT"█ █ █ █ █   █ █   █ █"
1660 PRINT"█ █ █ █ █████ █ █ █ █"
1670 PRINT"█   █ █     █ █ █ █ █"
1680 PRINT"█████ ███ █ █ █ ███ █"
1690 PRINT"█   █   █ █ █ █     █"
1700 PRINT"█ █ █ █ █ █ █ █ █ █ █"
1710 PRINT"█ █   █ █ █ █ █ █ █ █"
1720 PRINT"█ █████ █ █ █ ███ █ █"
1730 PRINT"█         █ █     █ █"
1740 PRINT"█ █████████ ███████ █"
1750 PRINT"█ █                 █"
1760 PRINT"█ █ ███ █████████████"
1770 PRINT"█   █ █ █         █ █"
1780 PRINT"█████ █ █ ███ █████ █"
1790 PRINT"█           █       █"
1800 PRINT"█ ███ █████ █ █ ███ █"
1810 PRINT"█   █       █ █   █ █"
1820 PRINT"█████████████████████"
1830 RETURN
```

GRAPHICAL GOLF

BY IAN TURTLE

RUNS ON A ZX81 IN 8K

So you think you're another Arnold Palmer do you? Well, this round of golf will sort the men out from the boys!

Graphical Golf is an 18-hole simulation of the real game. It has been made as realistic as possible, with many of the features of the real thing.

Initially, the computer asks you if you would like a random or a normal course. If you choose the normal course, you will get the lengths and pars of holes stored in the REM statement in line 10.

If you choose the random course, you have access to over 65 000 different courses by inputting a number between 1 and 65 000+ in reply to "COURSE NO?". If you want to play that course again sometime, simply input the same number in response to "COURSE NO?". Finally, you asked to input your handicap, else input 24. If you play well enough, your handicap will be reduced at the end of the round.

From now, you are on the course. If you have a ZX81, you will see the computer draw the hole, else, on the ZX80, the screen will simply go blank for 10 seconds or so. When the computer has finished, you will be presented with a graphical representation of a golf hole.

The computer will then ask you for your choice of club. You have 22 clubs, consisting of 1-4 woods, 1-9 irons and with their own percentage swing. Next you are asked to input an angle of shot. An input of 'O' degrees means straight ahead, '90' straight up, etc.

You'll encounter all the hazards of a real course, bunkers, the rough, and even water traps

The computer will print out a scorecard for each round you play — and maybe even reduce your handicap should your performance warrant it!

```
  10 REM 3614389420635005408435944244388419634004560513233574294
4475537541803550 5
  20 LET V=VAL "1"
  30 LET Y=VAL "0"
  40 PRINT TAB VAL "9";"GRAPHICA
L GOLF"
  50 PRINT
  60 PRINT TAB VAL "7";"(C)IAN T
URTLE,1981"
  70 PRINT
  80 PRINT "RANDOM OR NORMAL COU
RSE?-R/N"
  90 PAUSE VAL "40000"
 100 LET Z$=INKEY$
 110 IF Z$<>"R" AND Z$<>"N" THEN
 GOTO VAL "80"
 120 DIM L(VAL "18")
 130 DIM P(VAL "18")
 140 DIM S(VAL "18")
 150 IF Z$="R" THEN GOTO VAL "26
0"
 160 LET ZZ=VAL "16513"
 170 FOR H=V TO VAL "18"
 180 FOR A=V TO VAL "3"
 190 LET ZZ=ZZ+V
 200 LET L(H)=L(H)*VAL "10"+PEEK
 (ZZ)-VAL "28"
 210 NEXT A
 220 LET ZZ=ZZ+V
 230 LET P(H)=PEEK (ZZ)-VAL "28"
 240 NEXT H
 250 GOTO VAL "330"
 260 PRINT "COURSE NO?"
 263 INPUT ZZ
 266 RAND ZZ
 267 LET ZZ=Y
 270 FOR H=V TO VAL "18"
 280 LET L(H)=INT (RND*VAL "420"
)+VAL "181"
 290 LET P(H)=VAL "3"+(L(H)>VAL
"279")+(L(H)>VAL "499")
 295 LET ZZ=ZZ+P(H)
 300 NEXT H
 305 PRINT "PAR=";ZZ
 310 FOR A=V TO VAL "2"
 320 NEXT A
 330 LET A$=""
 340 LET B$=""
 350 FOR B=V TO VAL "32"
 360 LET A$=A$+CHR$ VAL "8"
 370 LET B$=B$+CHR$ Y
 380 NEXT B
 390 LET AS=Y
 393 LET PB=Y
 395 LET RC=V
 400 LET CI=Y
 410 LET PS=Y
 420 LET HP=Y
 430 LET UP=Y
 440 LET TS=Y
 450 LET PR=Y
 460 LET ZZ=Y
 470 LET YY=Y
 480 LET XX=Y
 490 LET SH=Y
 500 LET DF=Y
 510 LET HS=Y
 520 LET VS=Y
 530 LET BP=Y
 540 LET MC=Y
 550 LET TG=Y
 570 PRINT "HANDICAP?"
 580 INPUT HA
 585 RAND
 590 CLS
 595 LET DF=PEEK VAL "16396"+VAL
"256"*PEEK VAL "16397"
 600 FOR H=V TO VAL "18"
 610 LET PR=PR+P(H)
 620 LET SH=Y
 700 FOR A=V TO VAL "18"
 710 PRINT A$
 720 NEXT A
 730 PRINT "HOLE ";H;"  DIST ";L
(H);"  PAR ";P(H)
 740 LET UP=VAL "3"+INT (RND*VAL
 "13")
 745 LET TG=UP
 750 FOR A=V TO L(H)/VAL "20"-V
 760 FOR B=-V-(RND>.5) TO V+(RND
>.5)
 770 POKE (UP+B)*VAL "33"+A+DF,Y
 780 NEXT B
 790 LET UP=UP+(RND>.5)-(RND>.5)
 800 LET UP=UP-(UP>VAL "15")+(UP
<VAL "2")
 810 NEXT A
 820 LET HP=INT (L(H)/VAL "20")-
V
 830 FOR A=-V-(RND>.3) TO V+(RND
>.3)
 850 FOR B=-V-(RND>.3) TO V+(RND
>.3)
 860 POKE (UA+B)*VAL "33"+HP+A+D
F,VAL "128"
 870 NEXT B
 880 NEXT A
 890 POKE UP*VAL "33"+HP+DF,VAL
"149"
 900 POKE DF+TG*VAL "33"+V,VAL "
185"
 910 LET ZZ=VAL "-3"+INT (RND*VA
L "7")
 920 LET YY=DF+(UP+ZZ)*VAL "33"+
HP
 930 IF PEEK (YY)<>VAL "8" AND P
EEK (YY)<>Y THEN GOTO VAL "910"
 940 POKE YY,VAL "52"
 950 FOR A=V TO VAL "4"+(RND>.4)
 960 LET ZZ=VAL "-3"-INT (RND*VA
L "3")
 970 LET XX=VAL "-3"+INT (RND*VA
L "7")
 980 LET YY=DF+(UP+XX)*VAL "33"+
HP+ZZ
 990 IF PEEK (YY)<>VAL "8" AND P
EEK (YY)<>Y THEN GOTO VAL "960"
1000 POKE YY,VAL "52"
1010 NEXT A
1020 IF P(H)<VAL "4" THEN GOTO V
AL "1240"
1030 LET HP=VAL "10"
```

```
1040 FOR A=V TO VAL "4"+(RND>.4)
1050 LET ZZ=HP+INT (RND*VAL "4")
1060 FOR B=Y TO VAL "17"
1070 LET YY=DF+B*VAL "33"+ZZ
1080 IF PEEK (YY)<>Y THEN GOTO V
AL "1110"
1090 POKE YY,VAL "52"
1100 GOTO VAL "1120"
1110 NEXT B
1120 NEXT A
1130 IF P(H)<VAL "5" THEN GOTO V
AL "1240"
1140 LET HP=VAL "17"
1150 FOR A=V TO VAL "4"+(RND>.4)
1160 LET ZZ=HP+INT (RND*VAL "4")
1170 FOR B=Y TO VAL "17"
1180 LET YY=DF+B*VAL "33"+ZZ
1190 IF PEEK (YY)<>Y THEN GOTO V
AL "1220"
1200 POKE YY,VAL "52"
1210 GOTO VAL "1230"
1220 NEXT B
1230 NEXT A
1240 IF RND>.25 THEN GOTO VAL "1
310"
1250 LET HP=INT (L(H)/VAL "40")
1260 FOR A=Y TO VAL "17"
1270 POKE A*VAL "33"+HP+DF,VAL "
152"
1280 LET HP=HP+(RND>.5)-(RND>.5)
1290 LET HP=HP+(HP<VAL "2")-(HP>
=L(H)/VAL "20")
1300 NEXT A
1310 LET HP=V
1320 LET VP=TG
1330 LET PB=Y
1350 PRINT AT VAL "21",Y;"CLUB?"
1360 INPUT CI
1370 IF CI<V OR CI>VAL "29" OR C
I>VAL "4" AND CI<VAL "11" OR CI=
VAL "20" OR CI<MC THEN GOTO VAL
"1360"
1375 LET MC=Y
1380 IF CI>VAL "19" THEN GOTO VA
L "1410"
1390 LET PS=VAL "100"
1400 GOTO VAL "1450"
1410 PRINT AT VAL "21",Y;"PERCEN
TAGE SWING?(50-100)"
1430 INPUT PS
1440 IF PS<VAL "50" OR PS>VAL "1
00" THEN GOTO VAL "1430"
1450 PRINT AT VAL "21",Y;"SHOT A
NGLE?(-180 TO +180)"
1470 INPUT AS
1480 IF AS<VAL "-180" OR AS>VAL
"180" THEN GOTO VAL "1470"
1483 PRINT AT VAL "21",Y;B$
1484 PRINT AT VAL "20",Y;B$
1485 IF PB = V THEN POKE BP, YY
1490 LET AS=INT (AS+RND*(VAL "22
"+HA)-RND*(VAL "22"+HA))
1500 LET AS=(AS*PI)/VAL "180"
1510 LET SH=SH+V
1520 LET PS=PS/VAL "100"
1530 IF CI>VAL "20" THEN LET CI=
CI-VAL "10"
1533 IF CI>VAL "10" THEN LET CI=
CI-VAL "6"
1536 LET CI=VAL "16"-CI
1537 POKE DF+V,VAL "28"+SH
1540 LET HS=INT (((((CI*(VAL "14
"+INT (RND*VAL "3")))*PS*RC)*COS
 (AS))/VAL "20")+.5)
1545 LET VS=INT (((((CI*(VAL "14
"+INT (RND*VAL "3")))*PS*RC)*SIN
 (AS))/VAL "20")+.5)
1547 LET RC=V
1550 LET BP=DF+HP+HS+(VP+VS)*VAL
 "33"
1560 IF HP+HS>VAL "32" OR HP+HS<
V OR VP+VS<Y OR VP+VS>VAL "17" T
HEN GOTO VAL "1670"
1580 LET YY=PEEK (BP)
1590 IF YY=VAL "152" THEN GOTO V
AL "1720"
1595 LET PB=V
1600 FOR A=V TO VAL "3"
1602 POKE BP, YY
1603 PAUSE VAL "50"
1604 POKE BP,VAL "155"
1605 PAUSE VAL "50"
1606 NEXT A
1610 IF YY=VAL "128" OR YY=VAL "
149" THEN GOTO VAL "2000"
1620 IF YY=VAL "8" THEN GOTO VAL
 "1750"
```

```
1630 IF YY=VAL "52" THEN GOTO VA
L "1830"
1640 PRINT AT VAL "20",Y;B$
1650 PRINT AT VAL "20",Y;"ON FAI
RWAY"
1660 GOTO VAL "1930"
1670 PRINT AT VAL "20",Y;B$
1680 PRINT AT VAL "20",Y;"OUT OF
 BOUNDS-PENELTY 1 STROKE"
1690 LET SH=SH+V
1695 LET PB=Y
1700 PAUSE VAL "100"
1710 GOTO VAL "1340"
1720 PRINT AT VAL "20",Y;B$
1730 PRINT AT VAL "20",Y;"SPLASH
 IN WATER-PEN. 1 STROKE"
1740 GOTO VAL "1690"
1750 PRINT AT VAL "20", Y; B$
1755 LET MC=VAL "11"
1760 IF RND>.4 THEN GOTO VAL "18
00"
1770 PRINT AT VAL "20",Y;"IN HEA
VY ROUGH"
1780 LET RC=.6+RND/VAL "5"
1790 GOTO VAL "1930"
1800 PRINT AT VAL "20",Y;"IN LIG
HT ROUGH"
1810 LET RC=.8+RND/VAL "5"
1820 GOTO VAL "1930"
1830 PRINT AT VAL "20",Y;B$
1840 PRINT AT VAL "20",Y;"BUNKER
ED-";
1850 LET ZZ=INT (RND*VAL "3")
1860 IF ZZ=V THEN PRINT "GOOD";
1870 IF ZZ=V THEN LET MC=VAL "24
"+INT (RND*VAL "2")
1880 IF ZZ=Y THEN PRINT "AV.";
1890 IF ZZ=Y THEN LET MC=VAL "26
"+INT (RND*VAL "2")
1900 IF ZZ=VAL "2" THEN PRINT "B
AD";
1910 IF ZZ=VAL "2" THEN LET MC=V
AL "28"+INT (RND*VAL "2")
1915 LET RC=.7-ZZ/VAL "10"+RND/V
AL "5"
1920 PRINT " LIE,MAX.CLUB ";MC
1930 PAUSE VAL "100"
1940 LET HP=HP+HS
1950 LET VP=VP+VS
1960 GOTO VAL "1350"
2000 LET HP=HP+HS
2010 PRINT AT VAL "20",Y;B$
2020 PRINT AT VAL "20",Y;"ON THE
 GREEN IN ";SH
2030 PAUSE VAL "150"
2040 CLS
2050 PRINT TAB VAL "17";"▄▄▄▄"
2060 PRINT TAB VAL "17";"█  █"
2070 PRINT TAB VAL "17";"▀▀▀█"
2080 FOR A=V TO VAL "6"
2090 PRINT TAB VAL "20";"▌"
2130 NEXT A
2140 PRINT "▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒
▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
2150 POKE DF+VAL "52",VAL "128"+
VAL "29"*(INT (H/VAL "10")=V)
2160 POKE DF+VAL "53",VAL "156"+
H-(INT (H/VAL "10")*VAL "10")
2170 LET TG=VAL "2"+INT (RND*VAL
 "3")
2180 IF TG=VAL "2" THEN PRINT "S
LOW";
2190 IF TG=VAL "3" THEN PRINT "M
EDIUM";
2200 IF TG=VAL "4" THEN PRINT "F
AST";
2210 PRINT " GREEN"
2220 PRINT AT VAL "12",VAL "3";"
FT.FROM PIN"
2230 LET YY=ABS (HP+V-INT (L(H)/
VAL "20"))
2240 LET BP=INT (YY*VAL "20"+RND
*VAL "20")+V
2250 PRINT AT VAL "12",Y;"   "
2260 PRINT AT VAL "12",Y;ABS BP
2270 IF ABS BP<VAL "2" THEN GOTO
 VAL "2460"
2280 LET YY=VAL "20"-INT ((BP/VA
L "3")+V)
2290 IF YY>VAL "32" THEN LET YY=
VAL "32"
2300 IF YY<V THEN LET YY=V
2310 LET YY=YY-(YY=VAL "20")+(YY
=VAL "21")
2320 POKE DF+VAL "297"+YY,VAL "5
2"
2330 PRINT AT VAL "13",Y;"PUTTIN
```

```
G STRENGTH?(1-20)"
2340 INPUT ZZ
2350 IF ZZ<V OR ZZ>VAL "20" THEN
 GOTO VAL "2340"
2360 IF BP<Y THEN LET XX=V
2370 IF BP>Y THEN LET XX=-V
2380 POKE DF+VAL "297"+YY,VAL "9
"
2400 PAUSE VAL "60"
2410 FOR A=V TO ZZ
2420 LET BP=BP+XX*(V+INT (RND*TG
))
2430 NEXT A
2440 LET SH=SH+V
2450 GOTO VAL "2250"
2460 POKE DF+VAL "317",VAL "52"
2470 PAUSE VAL "50"
2480 POKE DF+VAL "317",VAL "131"
2490 PAUSE VAL "100"
2500 CLS
2510 PRINT "YOU HOLED OUT IN ";S
H;" SHOTS"
2520 LET S(H)=SH
2530 LET ZZ=SH-P(H)
2540 IF ZZ=VAL "-3" THEN PRINT "
EXCELLANT-AN ALBERTROSS"
2550 IF ZZ=VAL "-2" AND P(H)=VAL
 "3" THEN PRINT "UNBELIEVABLE-A
HOLE IN ONE"
2560 IF ZZ=VAL "-2" AND P(H)<>VA
L "3" THEN PRINT "GREAT-AN EAGLE
"
2570 IF ZZ=VAL "-1" THEN PRINT "
VERY GOOD-A BIRDIE"
2580 IF ZZ=Y THEN PRINT "WELL DO
NE-A PAR"
2590 IF ZZ=V THEN PRINT "HHHMMM-
A BOGEY"
2600 IF ZZ>V THEN PRINT "KEEP YO
UR HEAD DOWN"
2610 PRINT
2620 LET TS=TS+SH
2630 LET ZZ=TS-PR
2640 PRINT "YOU ARE NOW ";
2650 IF ZZ<Y THEN PRINT ABS ZZ;"
 UNDER";
2660 IF ZZ=Y THEN PRINT "LEVEL";
2670 IF ZZ>Y THEN PRINT ZZ;" OVE
R";
2680 PRINT " PAR(GROSS)"
2690 PRINT
2700 PRINT "PRESS ANY KEY"
2710 PAUSE VAL "40000"
2720 CLS
2730 NEXT H
2740 PRINT TAB VAL "12";"SCORECA
RD"
2750 PRINT TAB VAL "3";"HOLE";TA
B VAL "11";"DIST";TAB VAL "19";"
PAR";TAB VAL "26";"SHOTS"
2760 FOR H=V TO VAL "18"
2770 PRINT TAB VAL "4";H;TAB VAL
 "12";L(H);TAB VAL "20";P(H);TAB
 VAL "28";S(H)
2780 NEXT H
2790 PRINT "ANY KEY";TAB VAL "19
";PR;TAB VAL "27";TS
2800 PAUSE VAL "40000"
2810 CLS
2820 PRINT "YOU TOOK ";TS;" SHOT
S"
2830 PRINT "(NET ";TS-HA;")"
2840 PRINT
2850 LET ZZ=TS-PR-HA
2860 PRINT "YOU FINISHED ";
2870 IF ZZ<Y THEN PRINT ABS ZZ;"
 UNDER";
2880 IF ZZ=Y THEN PRINT "LEVEL";
2890 IF ZZ>Y THEN PRINT ZZ;" OVE
R";
2900 PRINT " PAR(NET)"
2910 IF HA=Y THEN STOP
2920 IF ZZ>VAL "-2" THEN LET PD=
Y
2930 IF ZZ<-V THEN LET PD=-V
2940 IF ZZ<VAL "-3" THEN LET PD=
VAL "-2"
2950 IF ABS PD>HA THEN LET PD=-H
A
2960 PRINT
2970 PRINT "AS A RESULT:"
2980 IF PD=Y THEN GOTO VAL "3020
"
2990 PRINT "HANDICAP IS DOWN ";A
BS PD;" SHOTS"," TO ";HA+PD
3000 STOP
3020 PRINT "YOUR HANDICAP STAYS A
T ";HA;" SHOTS"
3030 STOP
```

DODGEMS

BY S. JAMES & R. NURSE

RUNS ON A BBC MODEL B

Vroom, vroom! Here they come — it's the duelling dodgems!

But these are not really like those old fairground favourites. There's more than a touch of motorway madness in this game.

Your BBC micro will set up a square-shaped race track for you — and two cars will appear. One red and one green. You are in control of the green car. The computer controls the red one.

IN 32K

The computer-car will proceed to rush around the track int he opposite direction to your red car — and it's aim is extremely unfriendly. It wants to knock you off the road as quickly as possible. You must avoid the computer car.

```
 10high=0
 20MODE7:PROCINSTRUCT
 30MODE2:PROCSETUP:REM LAST PIECE OF PROGRAM
 SETS UP VARIOS COLOURS ETC.
 40SC=0:ENVELOPE1,3,0,0,0,0,0,0,121,-10,-5,-2,
 120,120
 50M=0:ONERROR MODE7:END
 60VDU23,1,0;0;0;0;
 70GOSUB150:GOSUB150
 80PROCDRAW:PROCFILLING
 90PROCMOVE1
100IFYD%=OY AND YA%=OX THEN1040
110PROCMOVE2
120IFYD%=OY AND YA%=OX THEN1040
130GOTO90
140END
150VDU23,250,0,238,68,255,255,68,238,0
160VDU23,251,24,90,126,90,24,90,126,90
170VDU23,126,255,255,255,255,255,255,255,255
180YD%=15:YA%=7:CAR$=CHR$251
190OX=2:OY=2:CAR2$=CHR$251
200MX=1:MY=0:HM=0:VM=1
210RETURN
220DEFPROCDRAW
230COLOURbackcol:COLOURforecol
240CLS
250PRINT"   SCORE:"
260PRINT"~~~~~~~~~~~~~~~~~~~"
270PRINT"~                 ~"
280PRINT"~ ~~~~~~~ ~~~~~~~ ~"
290PRINT"~ ~             ~ ~"
300PRINT"~ ~ ~~~~~ ~~~~~ ~ ~"
310PRINT"~ ~ ~         ~ ~ ~"
320PRINT"~ ~ ~ ~~~ ~~~ ~ ~ ~"
330PRINT"~ ~ ~ ~     ~ ~ ~ ~"
340PRINT"~ ~ ~ ~ ~~~ ~ ~ ~ ~"
350PRINT"~ ~ ~ ~ ~~~ ~ ~ ~ ~"
360PRINT"~ ~ ~ ~ ~~~ ~ ~ ~ ~"
370PRINT"~ ~ ~ ~ ~~~ ~ ~ ~ ~"
380PRINT"~ ~ ~ ~ ~~~ ~ ~ ~ ~"
390PRINT"~ ~ ~ ~ ~~~ ~ ~ ~ ~"
400PRINT"~       ~~~       ~"
410PRINT"~ ~ ~ ~ ~~~ ~ ~ ~ ~"
420PRINT"~ ~ ~ ~ ~~~ ~ ~ ~ ~"
430PRINT"~ ~ ~ ~ ~~~ ~ ~ ~ ~"
440PRINT"~ ~ ~ ~ ~~~ ~ ~ ~ ~"
450PRINT"~ ~ ~ ~ ~~~ ~ ~ ~ ~"
460PRINT"~ ~ ~ ~     ~ ~ ~ ~"
470PRINT"~ ~ ~ ~~~ ~~~ ~ ~ ~"
480PRINT"~ ~ ~         ~ ~ ~"
490PRINT"~ ~ ~~~~~ ~~~~~ ~ ~"
500PRINT"~ ~             ~ ~"
510PRINT"~ ~~~~~~~ ~~~~~~~ ~"
520PRINT"~                 ~"
530PRINT"~~~~~~~~~~~~~~~~~~~"
540ENDPROC
550DEFPROCMOVE1
560A=7236:M=0:*FX15,0
570PRINTTAB(YA%,YD%)" ";:IFA=0THEN610
```

```
 580M=((SGN(HM)<>0)-(SGN(VM)<>0))*2*((A=178)-(A=193))
 590IF FNREADCH(YA%+VM*SGN(M),YD%+HM*SGN(M))<>"~" AND FNREADCH(YA%+VM*M,YD%+HM*
M)<>"~" THEN YA%=YA%+VM*M:YD%=YD%+HM*M:IF FNREADCH(YA%-VM*M/2,YD%-HM*M/2)="."THE
NPRINTTAB(YA%-VM*M/2,YD%-HM*M/2);" ":SC=SC+score:COLOURscrcol:PRINTTAB(8,0);SC
 600REM
 610REM MOVE AROUND THE MAZE
 620TY=YD%+VM:TX=YA%+HM:A$=FNREADCH(TX,TY)
 630IFA$="."THENSC=SC+score:COLOURscrcol:PRINTTAB(8,0);SC
 640IFA$<>" " ANDA$<>"." PROCCHNG
 650YD%=YD%+VM:YA%=YA%+HM:SOUND1,1,100,1
 660COLOURyourcol:PRINTTAB(YA%,YD%)CAR$
 670ENDPROC
 680DEFPROCCHNG
 690IFVM=1 AND HM=0 THENVM=0:HM=1:CAR$=CHR$250:ENDPROC
 700IFVM=0 AND HM=1 THENVM=-1:HM=0:CAR$=CHR$251:ENDPROC
 710IFVM=-1 AND HM=0 THENVM=0:HM=-1:CAR$=CHR$250:ENDPROC
 720IFVM=0 AND HM=-1 THENVM=1:HM=0:CAR$=CHR$251:ENDPROC
 730DEFFNREADCH(X,Y)
 740LOCALA%,LASTX,LASTY,C
 750LASTX=POS:LASTY=VPOS
 760VDU31,X,Y
 770A%=135:C=USR(&FFF4) AND &FFFF
 780C=C DIV &100
 790VDU31,LASTX,LASTY
 800=CHR$(C)
 810DEFPROCMOVE2
 820TX=MX+OX:TY=MY+OY
 830A$=FNREADCH(TX,TY)
 840IF A$="~" THEN PROCCHAN
 850COLOURdotcol:PRINTTAB(OX,OY);"."
 860COLOURmycol:PRINTTAB(TX,TY);CAR2$:SOUND1,-8,50,1
 870OX=TX:OY=TY:PROCCHNGLANE
 880ENDPROC
 890DEFPROCCHAN
 900IF MX=0 AND MY=1 THEN MX=-1:MY=0:CAR2$=CHR$250:GOTO940
 910IF MX=-1 AND MY=0 THEN MX=0:MY=-1:CAR2$=CHR$251:GOTO940
 920IF MX=0 AND MY=-1 THEN MX=1:MY=0:CAR2$=CHR$250:GOTO940
 930IF MX=1 AND MY=0 THEN MX=0:MY=1:CAR2$=CHR$251:GOTO940
 940TX=MX+OX:TY=MY+OY:ENDPROC
 950DEFPROCCHNGLANE
 960DI=RND(3)-2:IFDI=0THEN960
 970A$=FNREADCH(OX+MY*DI,OY+MX*DI)
 980IFA$="~"THENENDPROC
 990A$=FNREADCH(OX+MY*DI*2,OY+MX*DI*2)
1000IFA$="~"THENENDPROC
1010COLOURdotcol:PRINTTAB(OX,OY);"."
1020OX=OX+MY*DI*2:OY=OY+MX*DI*2
1030COLOURmycol:PRINTTAB(OX,OY);CAR$:ENDPROC
1040REMHIT
1050VDU23,240,0,0,0,24,24,0,0,0
1060VDU23,241,0,0,60,36,36,60,0,0
1070VDU23,242,0,126,66,66,66,66,126,0
1080VDU23,243,255,129,129,129,129,129,129,255
1090X=OX:Y=OY
1100FORT=1TO45
1110VDU5:GCOL0,endcol
1120MOVEX*64,1020-Y*32
1130IF T AND 1<>0 THENPRINTCHR$240:MOVEX*64,1020-Y*32
1140IF T AND 2<>0 THENPRINTCHR$241:MOVEX*64,1020-Y*32
1150IF T AND 4<>0 THENPRINTCHR$242:MOVEX*64,1020-Y*32
1160IF T AND 8<>0 THENPRINTCHR$243:MOVEX*64,1020-Y*32
1170VDU4:PRINTTAB(OX,OY);" ":SOUND1,1,255-T*255/45,1:NEXT
1180CLS:*FX15,0
1190MODE7:PRINTTAB(5,10);"You scored ";SC
1200IF high<SC THEN high=SC
1210PRINTTAB(5,11);"High Score:";high
1220PRINT"     Do you want another go?"
1230A$=GET$
1240IFA$="Y"THEN30
1250IFA$="N"THENCLS:END
1260PRINTTAB(5,13);"Just a simple Y or N is sufficient.":GOTO1230
1270DEFPROCFILLING
1280RESTORE1460:GCOL0,dotcol:VDU5
1290MOVE0,up
1300FORT=1TO26:READA$:PRINT" ";A$:NEXT
1310VDU4:ENDPROC
1340DEFPROCINSTRUCT
1350PRINTTAB(13);CHR$141;"DODGEMS"
1360PRINTTAB(13);CHR$141;"DODGEMS"
1370PRINTTAB(14);"======="
1380PRINT'TAB(3)"Welcome to the game of Dodgems."
1390PRINT"In this you have a picture of a square  Race track.There are also two
 cars        The Red Car and The Green Car.The      only control you have over yo
ur car      (the green one) is that of either       moving in to a smaller"
1400PRINT"track or out to a larger one.The red cargoes around the track in an o
pposite    directions to you.To avoid it you must use these controls:"
1410PRINT"     A-Move in."
1420PRINT"     D-Move out."
1430PRINT''"Happy Dogeming!!"
1440PRINT'"Press space to start."
1450REPEAT A$=GET$:UNTILA$=" ":ENDPROC
```

```
1460DATA.................
1470DATA.       .       .
1480DATA. ............. .
1490DATA. .     .     . .
1500DATA. . ......... . .
1510DATA. . .   .   . . .
1520DATA. . . ..... . . .
1530DATA. . . .   . . . .
1531DATA. . . .   . . . .
1532DATA. . . .   . . . .
1533DATA. . . .   . . . .
1540DATA. . . .   . . . .
1550DATA. . . .   . . . .
1560DATA.......   .......
1570DATA. . . .   . . . .
1571DATA. . . .   . . . .
1580DATA. . . .   . . . .
1590DATA. . . .   . . . .
1600DATA. . . .   . . . .
1610DATA. . . ..... . . .
1620DATA. . .   .   . . .
1630DATA. . ......... . .
1640DATA. .     .     . .
1650DATA. ............. .
1660DATA.       .       .
1670DATA.................
```

```
10000DEFPROCSETUP
10010up=959:REM Start position of dots
10020backcol=132:REM Background colour
10030forecol=6:REM Foreground colour
10040yourcol=2:REM Colour of controled car
10050dotcol=3:REM Colour of dots
10060mycol=1:REM Colour of random car
10070scrcol=1:REM Colour of score
10080score=10:REM Increment of score
10090endcol=3:REM Colour of end graphics
10100ENDPROC
```

ALPHA ATTACK

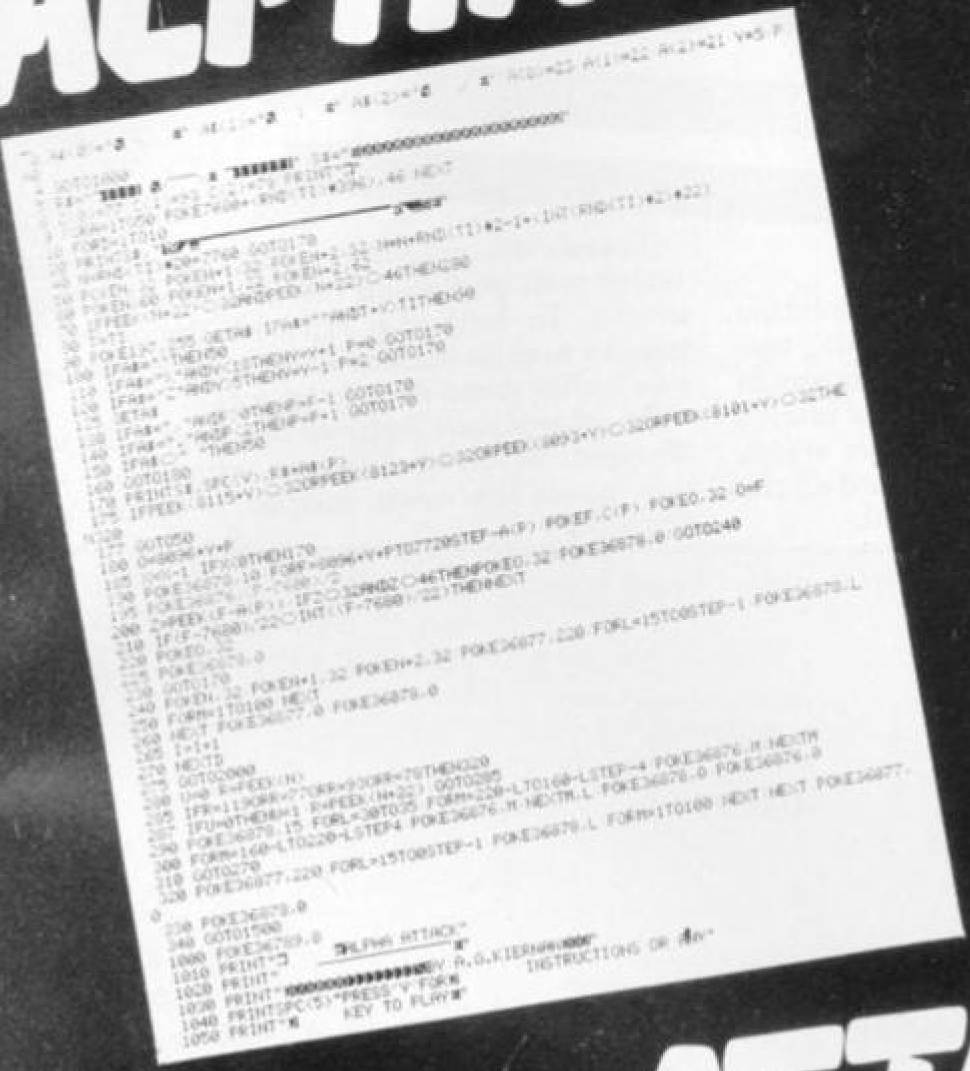
Your planet has been devastated by the marauding Astrol Fleet, the most warlike nation in the galaxy. Your defences are all but wiped out and the Astrol warrior-ships are closing in for the kill.

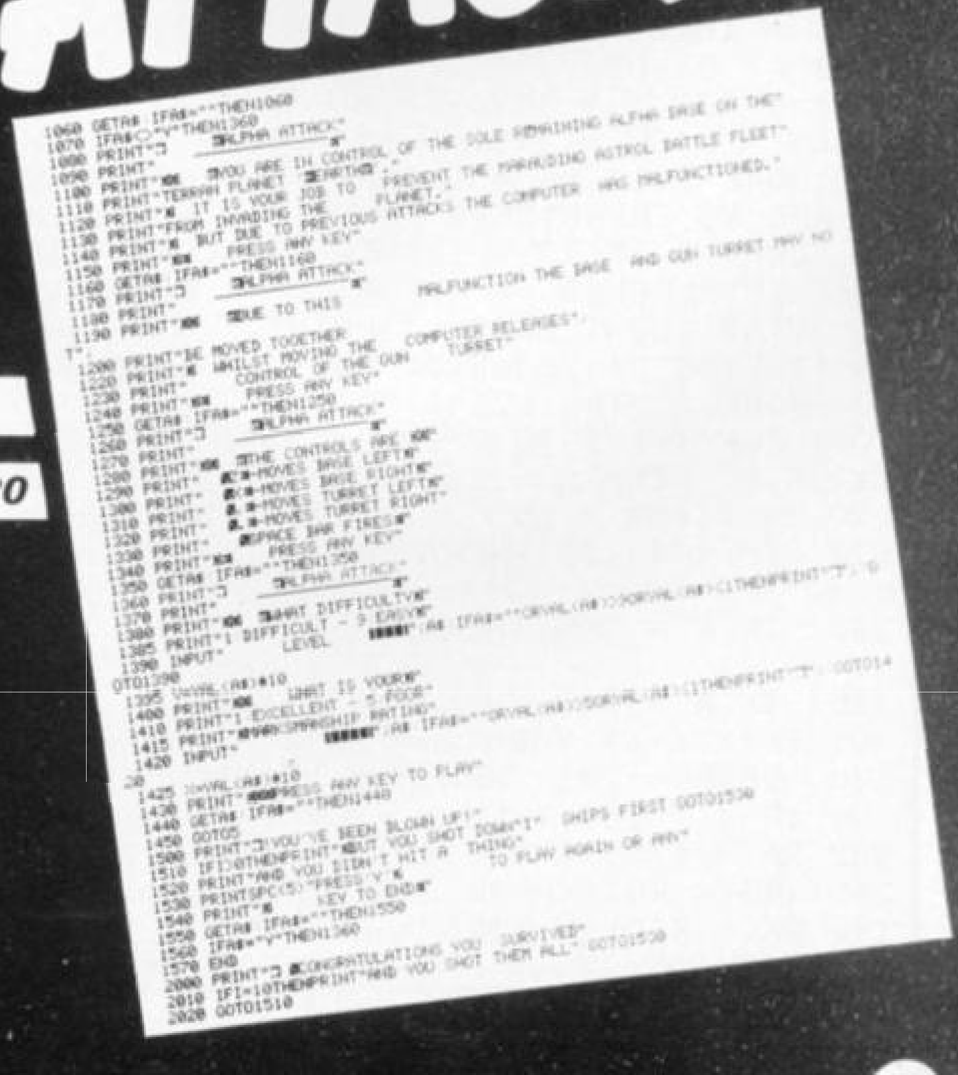
You are in control of the last Alpha defence base. But it is damaged and your laser is short of power.

But your turret does contain a multi-directional beam conveyor in working order — so you will be able to use your skill and judgement to destroy the descending Astrol Ships.

You can control the position of your Alfa base — but due to a computer malfunction you cannot move and fire your laser at the same time. The number of laser bolts which you have at your disposal is defined by a marksmanship rating which is input at the start of the game.

The future of your planet is in your hands. Can you stop the awful Astrols invading and laying waste to your home?





BY ALEX KEIRNAN

RUNS ON AN UNEXPANDED VIC-20

PACMAN

BY NEIL FORSYTH

RUNS ON AN APPLE IN 48K

Munch your way around a maze in this adaptation of the game that has inspired pop-records, tee-shirts, pinball machines, TV adverts and thousands of imitators. It's all here. The ghosts out to munch the greedy little pacman. The power pills which enable the Pacman to devour the ghosts. And all the devious twists and turns of the maze itself.

There's an indicator at the bottom of the screen which tells you when the ghosts are vulnerable to attack. To help the Pacman the maze has two sneaky escape exits at either side which could help you baffle those deadly ghosts.

To control your Pacman use keys 'I' for up, 'J'-left, 'K'-right, 'M'-down. Just one warning — don't play this game between meals, it could ruin your appetite!

```
0 S = 0:L = 3: GOSUB 3000: DIM VA( 14,11)
1  HOME : NORMAL
5  GOSUB 6000: GOSUB 10000
10  FOR Y = 0 TO 11
15  FOR X = 0 TO 14
20  READ A:VA( X,Y ) = A
22  IF S > 2230 AND A / 13 =  INT (A / 13) THEN A = (A / 13) *  SGN
 (S - 4470 ):VA( X,Y ) = A:NE = 1
25  NEXT X
27  NEXT Y
28  IF S > 0 THEN VA( 0,5 ) = 0:VA( 1,5 ) = 30:VA( 14,5 ) = 0:VA( 13,5 ) =
70:TB = 1
30  GOSUB 5000: ROT= 0: XDRAW 3 AT 129,145: XDRAW 2 AT 139,145: XDR
AW 3 AT 149,145
32  ROT= 0: SCALE= 1: FOR P = 1 TO L: XDRAW 2 AT P * 10 + 119,10: N
EXT P
35 V = 10:DI = 0:D =  - 1:A = 139:OA = A:B = 64:OB = B: ROT= 0: XDR
AW 3 AT OA,OB
40 X = 139:Y = 114:R = 0
45 OX = X:OY = Y:RO = R: ROT= RO: XDRAW 2 AT OX,OY
47  HOME : IF NE = 1 THEN  INVERSE : VTAB (21): PRINT "      NO TUNN
EL AND NO ENERGIZERS          ": NORMAL : GOTO 50
48  HOME : IF TB = 1 THEN  INVERSE : VTAB (21): PRINT "      THE TU
NNEL IS BLOCKED               ": NORMAL
50  VTAB (22): FLASH : PRINT "       HIT ANY KEY TO START
   ": POKE  - 16368,0: WAIT  - 16384,128: NORMAL
60  HOME : VTAB (21): PRINT "                  SCORE="
100  FOR T = 1 TO 2 STEP 0
110 K =  PEEK ( - 16384)
120 XA = (OX - 69) / 10:YA = (OY - 24) / 10:PA = VA( XA,YA)
125  IF K = 201 THEN R = 0: IF PA / 2 =  INT (PA / 2) THEN Y = Y -
V
130  IF K = 205 THEN R = 32: IF PA / 5 =  INT (PA / 5) THEN Y = Y +
 V
135  IF K = 202 THEN R = 48: IF PA / 7 =  INT (PA / 7) THEN X = X -
 V: IF X < 69 THEN X = 209
140  IF K = 203 THEN R = 16: IF PA / 3 =  INT (PA / 3) THEN X = X +
 V: IF X > 209 THEN X = 69
142 XA = (X - 69) / 10:YA = (Y - 24) / 10:PA = VA( XA,YA)
145  ROT= RO: XDRAW 2 AT OX,OY: ROT= R: XDRAW 2 AT X,Y
146 OX = X:OY = Y:RO = R
147  IF (A = X) * (B = Y) * (SF = 0) THEN  GOTO 1000
150  IF PA > 0 AND PA / 13 <  >  INT (PA / 13) THEN  ROT= 0: XDRAW
```

```
1 AT X,Y: POKE 768,96: POKE 769,3: CALL 770:VA(XA,YA) =  - PA:DT
= DT - 1:S = S + 10: VTAB (21): HTAB (20): PRINT S: IF DT = 0 THEN
 GOTO 2000
152  IF SF = 1 THEN  ROT= 0: RETURN
155  IF PA > 0 AND PA / 13 =  INT (PA / 13) THEN  ROT= 0: XDRAW 4 A
T X,Y: FOR P = 10 TO 1 STEP  - 1: POKE 768,P: POKE 769,3: CALL 77
0: NEXT P:VA(XA,YA) =  - PA: GOSUB 600
200 GH = VA((OA - 69) / 10,(OB - 24) / 10)
205 D =  - D:DI = 0
207  IF (Y = B) THEN  GOTO 215
210  IF D < 0 OR (X = A) THEN  GOTO 255
215  IF (X > A) THEN  GOTO 240
220  IF GH / 7 =  INT (GH / 7) THEN A = A - V: GOTO 320
230  GOTO 250
240  IF GH / 3 =  INT (GH / 3) THEN A = A + V: GOTO 320
250 DI = DI + 1:D =  - 1: IF DI = 2 THEN  GOTO 285
255  IF Y > B THEN  GOTO 270
260  IF GH / 2 =  INT (GH / 2) THEN B = B - V: GOTO 320
265  GOTO 275
270  IF GH / 5 =  INT (GH / 5) THEN B = B + V: GOTO 320
275 DI = DI + 1:D = 1: IF DI = 2 THEN  GOTO 285
280  GOTO 215
285  IF (X - A) *  SGN (X - A) > (Y - B) *  SGN (Y - B) THEN  GOTO
300
290  IF GH / 7 =  INT (GH / 7) THEN A = A - V:D = 1: GOTO 320
295 A = A + V:D = 1: GOTO 320
300  IF GH / 2 =  INT (GH / 2) THEN B = B - V:D =  - 1: GOTO 320
305 B = B + V:D =  - 1
320  IF A > 209 THEN A = 69
323  IF A < 69 THEN A = 209
325  ROT= 0: XDRAW 3 AT OA,OB: XDRAW 3 AT A,B: IF (A = X) * (B = Y)
 THEN  GOTO 1000
330 OA = A:OB = B
400  NEXT T
600 SF = 1: ROT= 0: XDRAW 3 AT 129,145: XDRAW 2 AT 139,145: XDRAW 3
 AT 149,145: XDRAW 2 AT 129,145: XDRAW 3 AT 139,145: XDRAW 2 AT 1
49,145
610  FOR Z = 1 TO 15
620  GOSUB 110: IF (X = A) * (Y = B) THEN  GOSUB 800: GOTO 700
630 P =  INT ( RND (1) * 3)
635 GH = VA((OA - 69) / 10,(OB - 24) / 10)
640  IF P = 2 AND GH / 5 =  INT (GH / 5) THEN B = B + V
650  IF P = 0 AND GH / 2 =  INT (GH / 2) THEN B = B - V
660  IF P = 3 AND GH / 7 =  INT (GH / 7) THEN A = A - V: IF A < 69
THEN A = 209
670  IF P = 1 AND GH / 3 =  INT (GH / 3) THEN A = A + V: IF A > 209
 THEN A = 69
680  ROT= 0: XDRAW 3 AT OA,OB: XDRAW 3 AT A,B:OA = A:OB = B
690  IF (X = A) * (Y = B) THEN  GOSUB 800
700  NEXT Z
710 SF = 0: ROT= 0: XDRAW 2 AT 129,145: XDRAW 3 AT 139,145: XDRAW 2
 AT 149,145: XDRAW 3 AT 129,145: XDRAW 2 AT 139,145: XDRAW 3 AT 1
49,145
715  FOR P = 1 TO 15:Z =  PEEK ( - 16336): NEXT P
720  RETURN
800  XDRAW 3 AT A,B:A = 139:B = 64:OA = A:OB = B: FOR P = 1 TO 5: P
RINT  CHR$ (7);: NEXT P:Z = 15: XDRAW 3 AT OA,OB:S = S + 100: VTA
B (21): HTAB (20): PRINT S: RETURN
1000  ROT= R: XDRAW 2 AT X,Y: SCALE= 2: FOR R = 0 TO 128 STEP 8: RO
T= R: XDRAW 2 AT X,Y:D =  PEEK ( - 16336): NEXT R: POKE  - 16368,
0: HOME : VTAB (21): HTAB (15): PRINT "SCORE = ";S
1005  XDRAW 2 AT X,Y: ROT= 0: SCALE= 1: XDRAW 3 AT A,B: XDRAW 2 AT
```

```
L * 10 + 119,10:L = L - 1: IF L > 0 THEN 35
1010  PRINT "DO YOU WANT ANOTHER GAME? ";: FOR P = 1 TO 500: NEXT P
: POKE  - 16368,0: GET Q$: IF Q$ = "Y" THEN  CLEAR : DIM VA(14,11
):L = 3: GOTO 1
1020  TEXT : HOME : END
1100  REM  ************************
2000  HOME : VTAB (22): FLASH : PRINT "PERFECT SCORE. WELL DONE
           ": FOR P = 1 TO 15: POKE 768,16 - P: POKE 769,6: CALL
 770: NEXT P: RESTORE : IF SF = 1 THEN  POP
2005 SF = 0: GOTO 1
3000  TEXT : HOME
3010  PRINT "****************************************";
3020  PRINT "*";: FLASH : PRINT "               PACMAN
    ";: NORMAL : PRINT "*";
3025  PRINT "*";: FLASH : PRINT "          BY NEIL FORSYTH
    ";: NORMAL : PRINT "*";
3030  PRINT "****************************************";
3040  PRINT : PRINT "SINCE THE GAME IS WELL KNOWN HERE ARE   SIMPLE
 INSTRUCTIONS"
3050  PRINT
3060  PRINT "  KEY             ACTION"
3070  PRINT "  ---             ------"
3080  PRINT "   I                UP"
3090  PRINT "   J               LEFT"
3100  PRINT "   K              RIGHT"
3110  PRINT "   M               DOWN"
3120  PRINT " OTHER KEYS        STOP"
3130  PRINT : PRINT " LARGE DOTS ARE ENERGIZERS."
3140  PRINT : PRINT " GHOST VULNERABILITY IS INDICATED AT THE SCREE
N BOTTOM BY TWO PACMEN WITH GHOST  IN THE MIDDLE."
3150  PRINT : PRINT : FLASH : PRINT "HIT ANY KEY FOR SCREEN SET UP
";: NORMAL : GET ZZ$: RETURN
5000  HGR
5002  FOR Y = 0 TO 11
5005  FOR X = 0 TO 14
5010 A = VA(X,Y)
5015 K = 69 + X * 10:V = 24 + Y * 10
5020  HCOLOR= 7
5050  IF A / 2 <  > INT (A / 2) THEN  HPLOT K - 5,V - 5 TO K + 5,V
 - 5
5055  IF A / 3 <  > INT (A / 3) THEN  HPLOT K + 5,V - 5 TO K + 5,V
 + 5
5060  IF A / 5 <  > INT (A / 5) THEN  HPLOT K - 5,V + 5 TO K + 5,V
 + 5
5065  IF A / 7 <  > INT (A / 7) THEN  HPLOT K - 5,V - 5 TO K - 5,V
 + 5
5067  IF A > 0 AND A / 13 =  INT (A / 13) THEN  XDRAW 4 AT K,V: GOT
O 5400
5070  IF A > 0 THEN  XDRAW 1 AT K,V:DT = DT + 1
5400  NEXT X
5410  NEXT Y
5420  HPLOT 0,0 TO 64,19: HPLOT 279,0 TO 214,19: HPLOT 0,159 TO 64,
139: HPLOT 279,159 TO 214,139
5500  RETURN
6000  FOR X = 770 TO 792
6010  READ Y
6020  POKE X,Y
6030  NEXT X
6040  DATA   173,48,192,136,208,5,206,1,3,240,9,202,208,245,174,0,
3,76,2,3,96,0,0
6050  RETURN
10000  HGR2 : POKE 232,16: POKE 233,64
```

```
10005   TEXT
10010   SCALE= 1: ROT= 0
10020   FOR X = 16400 TO 16460
10030   READ Y
10040   POKE X,Y
10050   NEXT X
10055   RETURN
10060   DATA    4,0,10,0,16,0,31,0,51,0
10070   DATA  42,36,63,54,21,0
10080   DATA 18,27,39,36,44,44,9,49,53,54,62,62,63,39,0
10090   DATA 46,30,46,9,36,39,37,39,39,63,46,62,35,23,46,21,63,54,6,
0
10100   DATA 53,30,60,60,12,37,21,21,6,0
20000   DATA  15,21,105,21,105,21,35,0,15,21,105,21,105,21,35
20010   DATA  10,15,42,35,6,35,30,273,70,15,14,15,42,35,10
20030   DATA  30,910,0,30,21,210,70,0,30,210,21,70,0,390,70
20040   DATA  10,6,105,14,15,14,30,21,70,6,35,6,105,14,10
20050   DATA 6,35,30,21,210,21,-210,-21,-210,21,210,21,70,15,14
20060   DATA -21,210,210,21,210,21,-70,0,- 30,21,210,21,210,210,-21
20070   DATA 15,14,30,35,6,35,-6,-105,-14,15,14,15,70,6,35
20080   DATA  3Q,105,14,30,21,210,105,42,105,210,21,70,6,105,70
20090   DATA  10,30,21,70,15,14,30,105,70,6,35,30,21,70,10
20100   DATA   30,70,0,30,14,195,14,-10,6,455,6,70,0,30,70
20110   DATA  10,6,105,14,15,14,15,42,35,6,35,6,105,14,10
20120   DATA  6,21,42,21,42,21,14,0,6,21,42,21,42,21,14
```

VICTORIAN SEWERS

Chaos in the city as the ancient sewers start to collapse. Can you rebuild them before the city slips into a giant hole in the ground?

Your job is to keep the traffic flowing around the city's gradually eroding road system.

This program is in TI Basic for a 99/4A console with no additions. It will also run in Extended Basic, and if you have the 32K expansion memory, it will run faster in Extended Basic than in TI basic.

This program uses several tricks you may find useful: The play board is set up with PRINT statements — the fastest way of doing this. The characters (the UNDERLINE ¡ is used here) are defined.)

Note the use of POS in lines 1660 and 690 — the neatest way of reacting to a CALL KEY input. If the key pressed does not appear in the first string then the program will goto/gosub the first line transfer, as the POS function will return nil.

Although TI Basic does not support AND and OR, these ARE used in this program, in lines 980 (* used for AND) and in line 1270 (+ used for OR) — also several other lines. Note the expressions are placed in brackets in these lines.

For greater speed the routines you plan are stored in a two dimensional array RT(N,M) which is read back to delete a route which suffers from a road collapse.

Conversion:

Pretty easy. The screen is composed of 24 rows of 32 characters. The PRINT lines start in column 3, and as they all start with a space, the first PRINTED is in column 4.

CALL HCHAR is in the format: CALL HCHAR (ROW, COLUMN, ASCII, No of times)

CALL GCHAR is in the format: CALL GCHAR (ROW, COLUMN, VARIABLE) in which the variable takes the ASCII code of the charter at that position.

The characters take the codes given in lines 2290-2340 and are all coloured blocks except the player (PLY) who is an 'R'.

Owners of machines with memory mapped screen should recognise the formula in lines (1870 (encryption) and 1400-1410 (decoding) — this program does not look at column 32 so a slight approximation has been used.

For machines without the POS function, you will need to test the key pressed and GOTO/GOSUB as appropriate.

BY STEPHEN SHAW

RUNS ON A TEXAS TI 99/4a

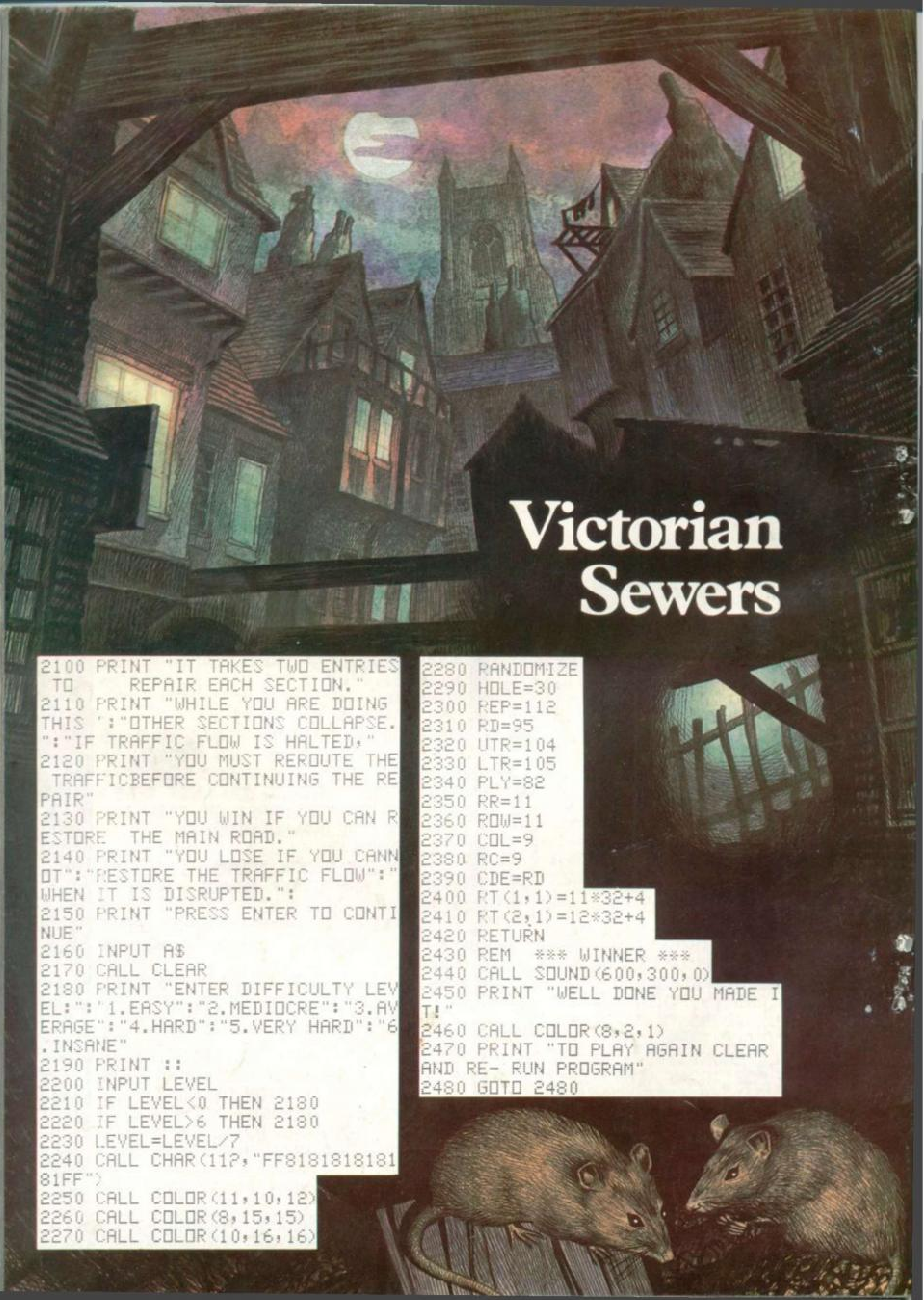
IN 4K

```
30 REM
31 REM  SETTING UP THE BOARD
32 REM  USE UNDERLINE: _
33 REM  -----------------
100 DEF V1=RND*10
110 DEF V2=RND*12
120 DEF F1=RND*290+110
130 DEF F2=RND*290+110
140 DEF TM=RND*500+300
150 DIM RT(2,70)
160 DEF FR=RND*100+400
170 S=30000
180 GOSUB 1930
190 CALL CLEAR
200 PRINT
210 PRINT " ----------------------
    "
----
220 PRINT " _  _   _   _   _   _
    "
_  _
230 PRINT " _  _   ----------
    "
```

```
240 PRINT " _  _   _        _
_  _"
250 PRINT " ____________________
____"
260 PRINT " _   _     _  _     _
   _"
270 PRINT " _   _     _  _     _
   _"
280 PRINT " _   ________________
   _"
290 PRINT " _   _  _        _  _
   _"
300 PRINT " ____________________
____"
310 PRINT " ____________________
____"
320 PRINT " _   _  _        _  _
   _"
330 PRINT " _   ________________
   _"
340 PRINT " _   _     _  _     _
   _"
350 PRINT " _   _     _  _     _
   _"
360 PRINT " ____________________
____"
370 PRINT " _  _   _        _
_  _"
380 PRINT " _  _   __________
_  _"
390 PRINT " _  _   _  _  _  _
_  _"
400 PRINT " ____________________
____"
410 PRINT
420 PRINT
430 CALL HCHAR(11,1,UTR,32)
440 CALL HCHAR(12,1,LTR,32)
450 REM  ROAD MAP DRAWN
460 CALL COLOR(1,4,4)
470 CALL HCHAR(11,I3,HOLE,6)
480 CALL HCHAR(12,13,HOLE,6)
490 CALL HCHAR(11,4,RD,9)
500 CALL HCHAR(12,4,RD,9)
510 CALL HCHAR(11,19,RD,9)
520 CALL HCHAR(12,19,RD,9)
530 A=1
540 ROW=11
550 COL=4
560 GUSUB 1520
570 A=2
580 ROW=12
590 COL=4
600 GOSUB 1520
610 CALL GCHAR(11,9,CDE)
620 REM  CONTROL SECTION
630 CALL KEY(0,K,ST)
640 IF RND<.99 THEN 660
650 CALL SOUND(TM,F1,V1,F2,V2)
660 CALL HCHAR(RR,RC,PLY)
670 CALL HCHAR(RR,RC,CDE)
680 IF ST<1 THEN 630
690 ON POS("ESDXR",CHR$(K),1)+1
GOSUB 720,730,790,850,910,980
700 GOSUB 1190
710 GOTO 630
720 RETURN
730 CALL GCHAR(RR-1,RC,CD)
740 IF CD=32 THEN 780
750 RR=RR-1
760 CALL HCHAR(RR,RC,PLY)
770 CDE=CD
780 RETURN
790 CALL GCHAR(RR,RC-1,CD)
800 IF CD=32 THEN 780
810 RC=RC-1
820 CALL HCHAR(RR,RC,PLY)
830 CDE=CD
840 RETURN
850 CALL GCHAR(RR,RC+1,CD)
860 IF CD=32 THEN 840
870 RC=RC+1
880 CALL HCHAR(RR,RC,PLY)
890 CDE=CD
900 RETURN
910 CALL GCHAR(RR+1,RC,CD)
920 IF CD=32 THEN 900
930 RR=RR+1
940 CALL HCHAR(RR,RC,PLY)
950 CDE=CD
960 RETURN
970 REM  REPAIR SECTION
980 IF (CDE<>HOLE)*(CDE<>REP)THE
N 1040
990 IF CDE=HOLE THEN 1000 ELSE
1050
1000 CDE=REP
1010 FOR T=1 TO 10
1020 CALL SOUND(-199,S,30,S,30,F
R,30,--4,0)
1030 NEXT T
1040 RETURN
1050 IF CDE=REP THEN 1060 ELSE
1040
1060 CDE=RD
1070 IF (RR=11)+(RR=12)THEN 1080
 ELSE 1040
1080 CALL HCHAR(RR,RC,CDE)
1090 FOR R=11 TO 12
1100 FOR C=3 TO 29
1110 CALL GCHAR(R,C,TEST)
1120 IF (TEST<>PLY)*(TEST<>RD)*(
TEST<>UTR)*(TEST<>LTR)THEN 1170
1130 NEXT C
1140 NEXT R
1150 REM  WINNER***
1160 GOTO 2430
1170 RETURN
1180 REM  DAMAGE
```

```
1190 C=INT(RND*22)+5
1200 R=INT(RND*20)+2
1210 CALL GCHAR(R,C,CD)
1220 IF (RR=R)*(RC=C)THEN 720
1230 IF (CD<>RD)*(CD<>UTR)*(CD<>
LTR)THEN 720
1240 IF RND>LEVEL THEN 720
1250 CALL HCHAR(R,C,HOLE)
1260 CALL SOUND(400,-8,0)
1270 IF (CD=UTR)+(CD=LTR)THEN 12
90
1280 RETURN
1290 FOR T2=1 TO 4
1300 FOR T=1 TO 5
1310 CALL SOUND(-99,500+T*20,T*4
)
1320 NEXT T
1330 CALL SOUND(-99,250,12,266,1
0)
1340 NEXT T2
1350 IF CD=LTR THEN 1380
1360 A=1
1370 GOTO 1390
1380 A=2
1390 FOR T=1 TO NUMB(A)
1400 ROW=INT(RT(A,T)/32)
1410 COL=(RT(A,T)/32-ROW)*32
1420 CALL GCHAR(ROW,COL,CD)
1430 IF (CD<>LTR)*(CD<>UTR)THEN
1450
1440 CALL HCHAR(ROW,COL,RD)
1450 NEXT T
1460 ROW=INT(RT(A,1)/32)
1470 COL=(RT(A,1)/32-ROW)*32
1480 CALL HCHAR(ROW,COL,PLY)
1490 GOSUB 1520
1500 RETURN
1510 REM  ROUTE TRAFFIC
1520 NUMB(A)=0
1530 IF A=1 THEN 1570
1540 IF A<>2 THEN 1580
1550 TR=LTR
1560 GOTO 1580
1570 TR=UTR
1580 GOTO 1870
1590 CALL KEY(0,K,ST)
1600 CALL HCHAR(ROW,COL,PLY)
1610 CALL HCHAR(ROW,COL,TR)
1620 IF RND<.99 THEN 1640
1630 CALL SOUND(TM,F1,V1,F2,V2)
1640 IF ST<1 THEN 1590
1650 CALL SOUND(100,110,4)
1660 ON POS("ESDX",CHR$(K),1)+1
GOTO 1590,1670,1720,1820,1770
1670 CALL GCHAR(ROW-1,COL,CD)
1680 IF CD<>RD THEN 1590
1690 ROW=ROW-1
1700 CALL HCHAR(ROW,COL,TR)
1710 GOTO 1870
1720 CALL GCHAR(ROW,COL-1,CD)
1730 IF CD<>RD THEN 1590
1740 COL=COL-1
1750 CALL HCHAR(ROW,COL,TR)
1760 GOTO 1870
1770 CALL GCHAR(ROW+1,COL,CD)
1780 IF CD<>RD THEN 1590
1790 ROW=ROW+1
1800 CALL HCHAR(ROW,COL,TR)
1810 GOTO 1870
1820 CALL GCHAR(ROW,COL+1,CD)
1830 IF CD<>RD THEN 1590
1840 COL=COL+1
1850 CALL HCHAR(ROW,COL,TR)
1860 GOTO 1870
1870 TOT=ROW*32+COL
1880 NUMB(A)=NUMB(A)+1
1890 RT(A,NUMB(A))=TOT
1900 IF (ROW=10+A)*(COL=27)THEN
1920
1910 GOTO 1590
1920 RETURN
1930 CALL CLEAR
1940 PRINT "VICTORIAN SEWERS"::'
(C)1982 STEPHEN SHAW"::
1950 PRINT "YOU MUST KEEP THE CI
TY":"TRAFFIC FLOWING.":"DESPITE
THE FREQUENT",
1960 PRINT "COLLAPSE OF SECTIONS
 OF ROADAS THE OLD SEWERS AT LAS
T   GIVE IN TO TIME."
1970 PRINT :::"PRESS ENTER TO CO
NTINUE..."
1980 INPUT A$
1990 CALL CLEAR
2000 PRINT "A MAIN ROUTE RUNS AC
ROSS THECENTRE OF THE  SCREEN.":
"A LARGE COLLAPSE TAKES PLACE"
2010 PRINT "FIRST YOU MUST REROU
TE EACH OF TWO LANES OF TRAFFIC"
:"USING THE ARROW KEYS:":"   E.S
.D.& X."
2020 PRINT "YOUR ROUTE MUST NOT
CROSS   ANY OTHER ROUTE NOR ANY"
:"DAMAGED SECTIONS."
2030 PRINT "PLAN YOUR ROUTE BEFO
RE YOU  BEGIN AS CORRECTIONS CAN
NOT BE MADE...":::
2040 PRINT "PRESS ENTER TO CONTI
NUE..."
2050 INPUT A$
2060 CALL CLEAR
2070 PRINT "WHEN TWO LANES OF TR
AFFIC   HAVE BEEN ROUTED YOU ENT
ER  ANOTHER SECTION OF PLAY."
2080 PRINT "YOU MUST MOVE YOUR R
EPAIR   GANG (R) USING THE CURSO
R   KEYS AND WHEN OVER DAMAGED
"

2090 PRINT "ROAD,REPAIR IT BY PR
ESSING  KEY 'R'."
```



Victorian Sewers

```
2100 PRINT "IT TAKES TWO ENTRIES
 TO      REPAIR EACH SECTION."
2110 PRINT "WHILE YOU ARE DOING 
THIS ":"OTHER SECTIONS COLLAPSE.
":"IF TRAFFIC FLOW IS HALTED,"
2120 PRINT "YOU MUST REROUTE THE
 TRAFFICBEFORE CONTINUING THE RE
PAIR"
2130 PRINT "YOU WIN IF YOU CAN R
ESTORE  THE MAIN ROAD."
2140 PRINT "YOU LOSE IF YOU CANN
OT":"RESTORE THE TRAFFIC FLOW":"
WHEN IT IS DISRUPTED.":
2150 PRINT "PRESS ENTER TO CONTI
NUE"
2160 INPUT A$
2170 CALL CLEAR
2180 PRINT "ENTER DIFFICULTY LEV
EL:":"1.EASY":"2.MEDIOCRE":"3.AV
ERAGE":"4.HARD":"5.VERY HARD":"6
.INSANE"
2190 PRINT ::
2200 INPUT LEVEL
2210 IF LEVEL<0 THEN 2180
2220 IF LEVEL>6 THEN 2180
2230 LEVEL=LEVEL/7
2240 CALL CHAR(112,"FF8181818181
81FF")
2250 CALL COLOR(11,10,12)
2260 CALL COLOR(8,15,15)
2270 CALL COLOR(10,16,16)
```

```
2280 RANDOMIZE
2290 HOLE=30
2300 REP=112
2310 RD=95
2320 UTR=104
2330 LTR=105
2340 PLY=82
2350 RR=11
2360 ROW=11
2370 COL=9
2380 RC=9
2390 CDE=RD
2400 RT(1,1)=11*32+4
2410 RT(2,1)=12*32+4
2420 RETURN
2430 REM  *** WINNER ***
2440 CALL SOUND(600,300,0)
2450 PRINT "WELL DONE YOU MADE I
T!"
2460 CALL COLOR(8,2,1)
2470 PRINT "TO PLAY AGAIN CLEAR
AND RE- RUN PROGRAM"
2480 GOTO 2480
```